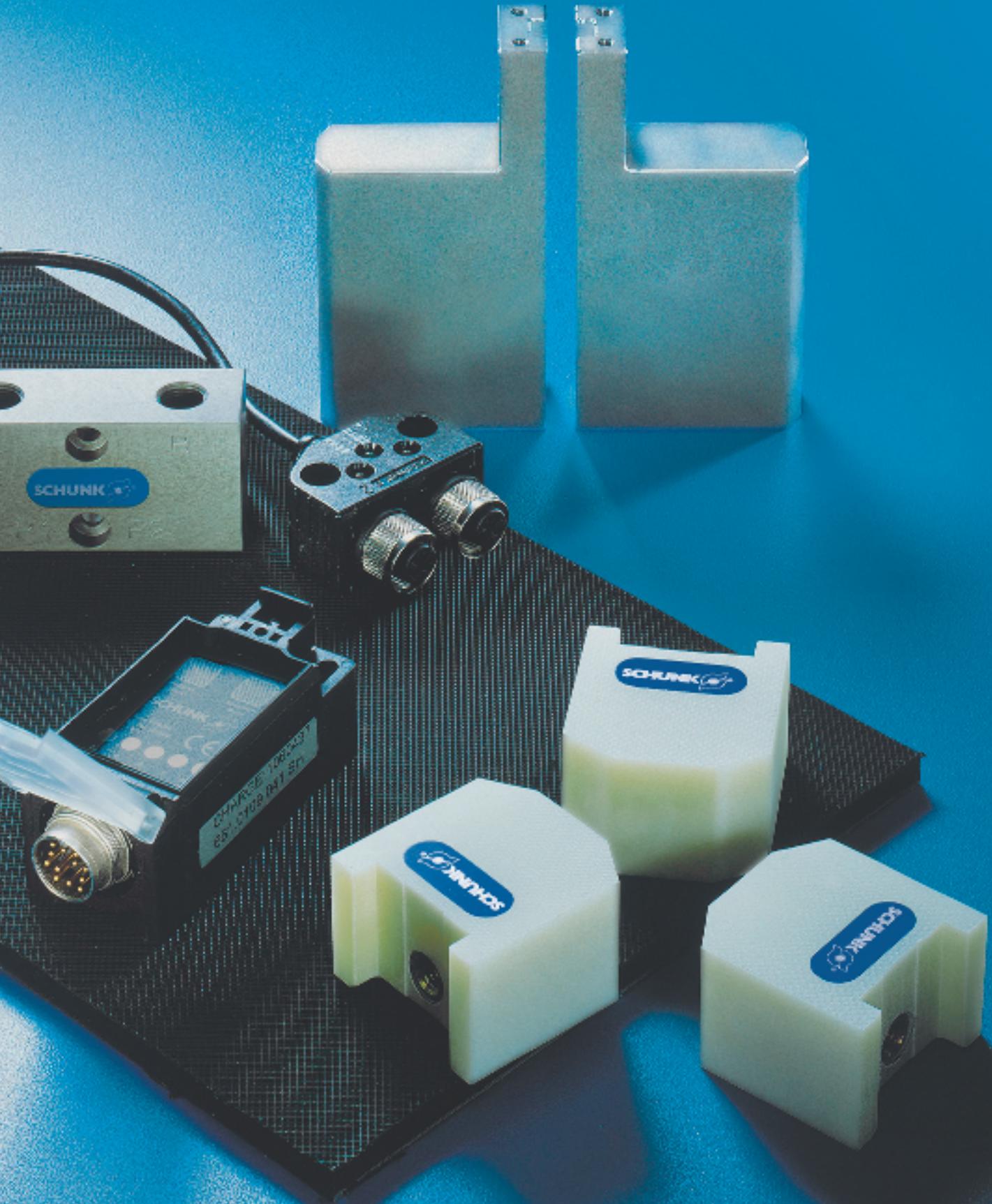


Accessories



ACCESSORIES

Series	Size	Page
Accessories		
MMS Magnetic Switches		404
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Magnetic Switches

Magnetic switches are used for monitoring the position of automation components. They detect the approach of a magnet without contact and, above a certain switching threshold, enable their output.



Function description

Magnetic switches react to magnetic fields. The resistors in the sensor consist of several ferromagnetic and non-magnetic layers. Two shielded and two non-shielded resistors are combined in a bridge circuit, which produces a strong signal proportional to the magnetic field when one is present. Above a threshold value, an output signal is switched via a comparator, and the sensor reacts.

Your advantages and benefits

Installation in sensor slot

for space-saving, simple and fast assembly

Version with LED display (MMS 22)

for checking the switching position directly at the sensor

Version with connector

for easy, rapid replacement of the extension cable

Application example

Area of application

For use in the monitoring of gripping and rotary modules, linear modules and robot accessories. Magnetic switches from SCHUNK detect metals without contact or wear and are resistant to vibration, dust and humidity. Magnetic switches are fitted in slots and therefore do not form any additional interfering contours.



1 MMS electronic Magnetic Switches
fitted in C-slot of the Mini-Slide

2 FST 16 – 60 Mini-Slides

General information

Material

Sensor housing: PA in the MMS 22, aluminum in the MMS 30
Cable: with PUR sheath

Mounting

Clamps in the sensor slot

Protection class in accordance with DIN 40050

IP 67 when connected

Voltage

10 - 30 V DC at < 10 % residual ripple

Switching method

PNP switching / NPN switching

Warranty

24 months

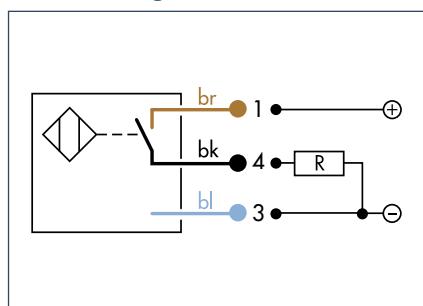
Notes

SCHUNK gripping, rotary and linear modules and robot accessory components that are to be monitored with electromagnetic slot-fitted switches can generally only be reliably monitored with the appropriate electromagnetic switches from SCHUNK. Sensors and products are matched on the basis of the relationships between the parameters type and field strength of the magnet, distance, wall thickness and wall material of the magnet and the sensor, and the orientation and sensitivity of the sensor itself.

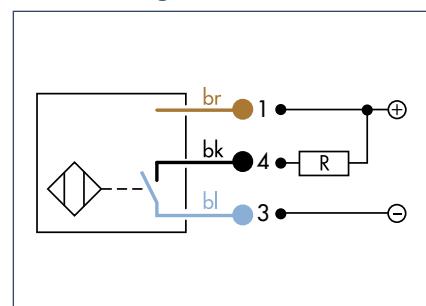
For this reason, sensors from other manufacturers employed in SCHUNK products rarely give satisfactory switching results.



Circuit diagram of closer

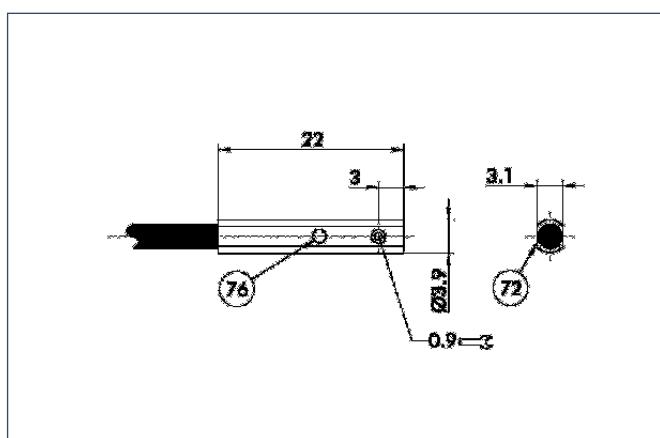
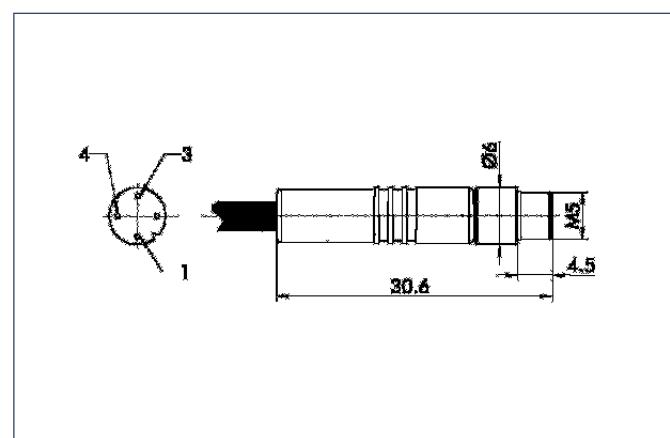
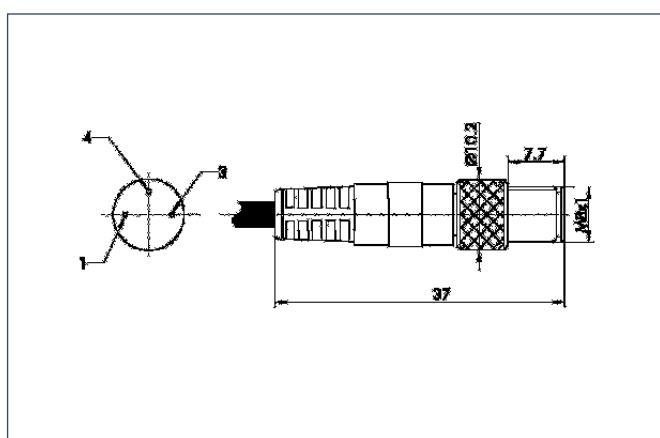


Circuit diagram of NPN closer



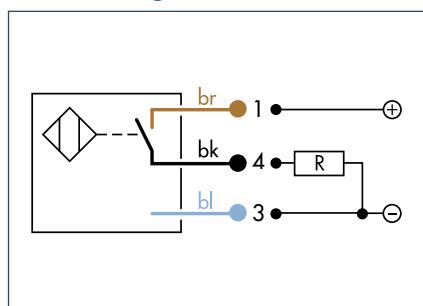
Technical data

Description	MMS 22-S-M5-PNP ID 0301454	MMS 22-S-M5-PNP ID 0301455	MMS 22-S-M8-PNP ID 0301450	MMS 22-S-M8-NPN ID 0301451	MMSK 22-S-PNP ID 0301452	MMSK 22-S-NPN ID 0301453
Switching function	Closer	Closer	Closer	Closer	Closer	Closer
Switching method	PNP	NPN	PNP	NPN	PNP	NPN
Cable length [cm]	30.0	30.0	30.0	30.0	200.0	200.0
Cable connector/cable end	M5	M5	M8	M8	Open wires	Open wires
Type of voltage	DC	DC	DC	DC	DC	DC
Nominal voltage [V]	24.0	24.0	24.0	24.0	24.0	24.0
Min. voltage [V]	10.0	10.0	10.0	10.0	10.0	10.0
Max. voltage [V]	30.0	30.0	30.0	30.0	30.0	30.0
Voltage drop [V]	1.5	1.5	1.5	1.5	1.5	1.5
Max. current on contact [A]	0.2	0.2	0.2	0.2	0.2	0.2
Min. ambient temperature [°C]	-10.0	-10.0	-10.0	-10.0	-10.0	-10.0
Max. ambient temperature [°C]	70.0	70.0	70.0	70.0	70.0	70.0
Typical switching time [s]	0.001	0.001	0.001	0.001	0.001	0.001
IP rating (sensor)	67	67	67	67	67	67
IP rating (connector, plugged in)	67	67	67	67	67	67
LED display on sensor	Yes	Yes	Yes	Yes	Yes	Yes
Cable diameter [mm]	2.1	2.1	2.1	2.1	2.1	2.1
Min. bending radius (dynamic) [mm]	21.0	21.0	21.0	21.0	21.0	21.0
Min. bending radius (static) [mm]	10.5	10.5	10.5	10.5	10.5	10.5
No. of wires	3	3	3	3	3	3
Wire cross section [mm²]	0.14	0.14	0.14	0.14	0.14	0.14

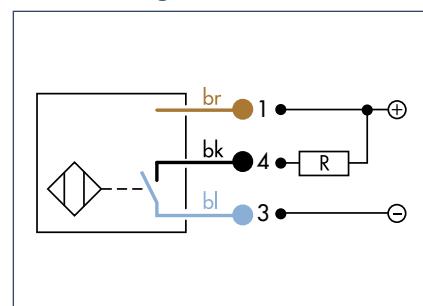
MMS 22 sensor**M5 connector****M8 connector**



Circuit diagram of closer

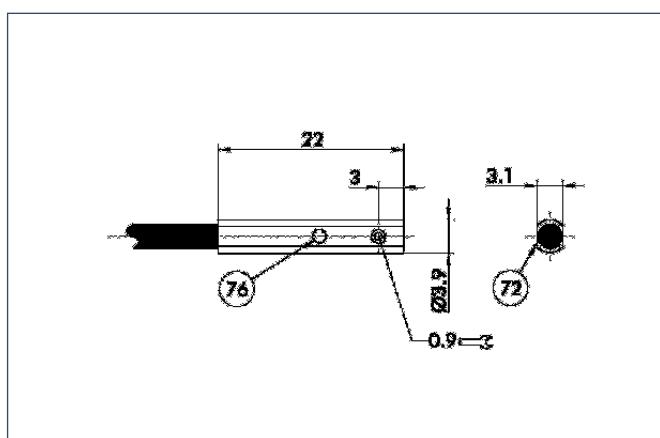


Circuit diagram of NPN closer



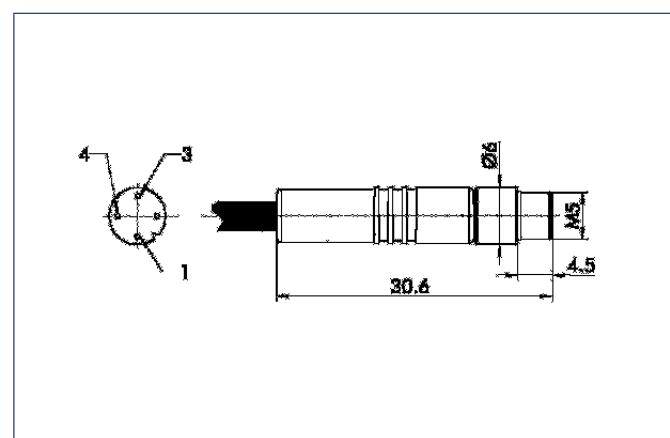
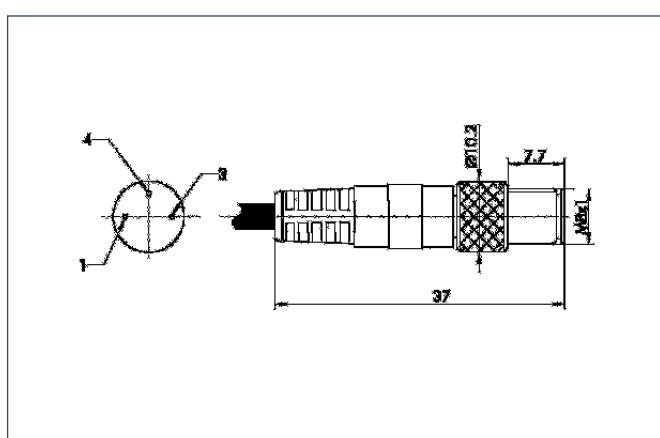
Technical data

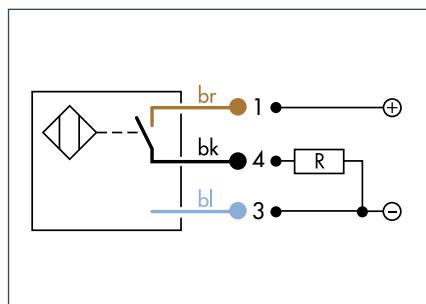
Description	MMS 22-S-M5-PNP-SA ID 0301460	MMS 22-S-M5-NPN-SA ID 0301461	MMS 22-S-M8-PNP-SA ID 0301456	MMS 22-S-M8-NPN-SA ID 0301457	MMSK 22-S-PNP-SA ID 0301458	MMSK 22-S-NPN-SA ID 0301459
Switching function	Closer	Closer	Closer	Closer	Closer	Closer
Switching method	PNP	NPN	PNP	NPN	PNP	NPN
Cable length [cm]	30.0	30.0	30.0	30.0	200.0	200.0
Cable connector/cable end	M5	M5	M8	M8	Open wires	Open wires
Type of voltage	DC	DC	DC	DC	DC	DC
Nominal voltage [V]	24.0	24.0	24.0	24.0	24.0	24.0
Min. voltage [V]	10.0	10.0	10.0	10.0	10.0	10.0
Max. voltage [V]	30.0	30.0	30.0	30.0	30.0	30.0
Voltage drop [V]	1.5	1.5	1.5	1.5	1.5	1.5
Max. current on contact [A]	0.2	0.2	0.2	0.2	0.2	0.2
Min. ambient temperature [°C]	-10.0	-10.0	-10.0	-10.0	-10.0	-10.0
Max. ambient temperature [°C]	70.0	70.0	70.0	70.0	70.0	70.0
Typical switching time [s]	0.001	0.001	0.001	0.001	0.001	0.001
IP rating (sensor)	67	67	67	67	67	67
IP rating (connector, plugged in)	67	67	67	67	67	67
LED display on sensor	Yes	Yes	Yes	Yes	Yes	Yes
Cable diameter [mm]	2.1	2.1	2.1	2.1	2.1	2.1
Min. bending radius (dynamic) [mm]	21.0	21.0	21.0	21.0	21.0	21.0
Min. bending radius (static) [mm]	10.5	10.5	10.5	10.5	10.5	10.5
No. of wires	3	3	3	3	3	3
Wire cross section [mm²]	0.14	0.14	0.14	0.14	0.14	0.14

MMS 22-SA sensor

(72) Active sensor surface

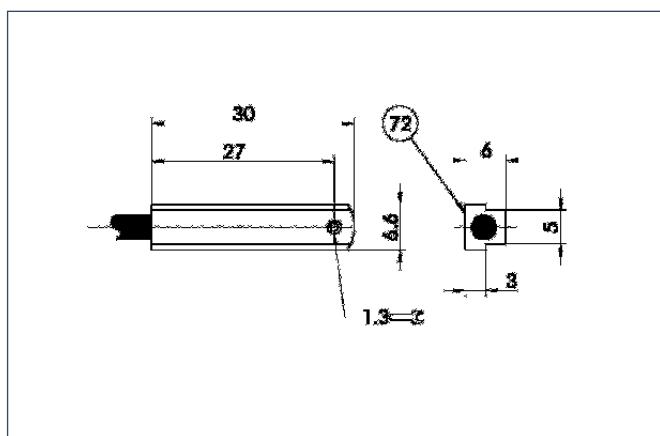
(76) LED

M5 connector**M8 connector**

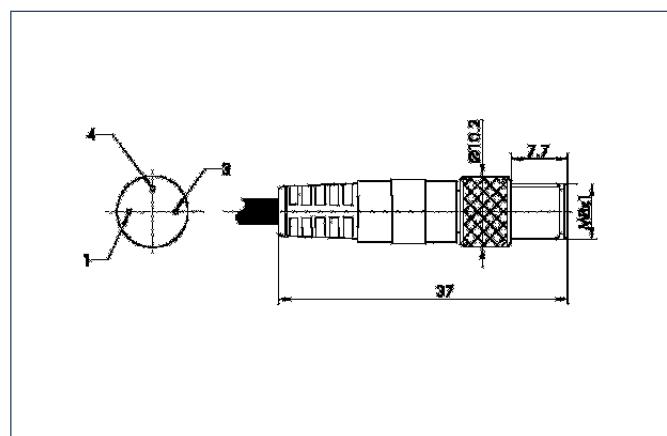
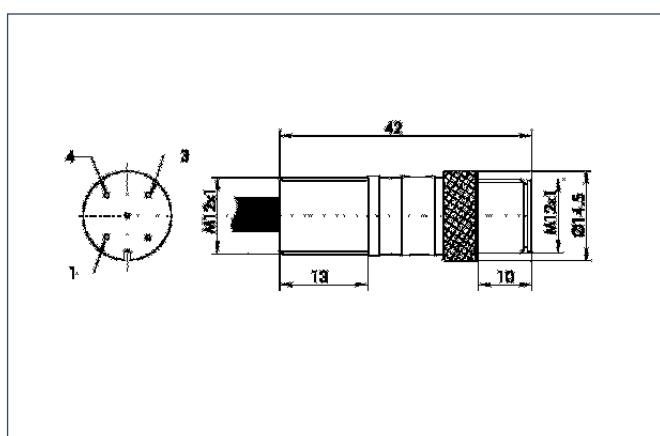


Technical data

Description	MMS 30-S-M8-PNP ID 0301471	MMS 30-S-M12-PNP ID 0301571	MMSK 30-S-PNP ID 0301563
Switching function	Closer	Closer	Closer
Switching method	PNP	PNP	PNP
Cable length [cm]	30.0	30.0	200.0
Cable connector/cable end	M8	M12	Open wires
Type of voltage	DC	DC	DC
Nominal voltage [V]	24.0	24.0	24.0
Min. voltage [V]	10.0	10.0	10.0
Max. voltage [V]	30.0	30.0	30.0
Voltage drop [V]	1.5	1.5	1.5
Max. current on contact [A]	0.2	0.2	0.2
Min. ambient temperature [°C]	-25.0	-25.0	-25.0
Max. ambient temperature [°C]	70.0	70.0	70.0
Typical switching time [s]	0.001	0.001	0.001
IP rating (sensor)	67	67	67
IP rating (connector, plugged in)	67	67	67
LED display on sensor	No	No	No
Cable diameter [mm]	3.5	3.5	3.5
Min. bending radius (dynamic) [mm]	35.0	35.0	35.0
Min. bending radius (static) [mm]	17.5	17.5	17.5
No. of wires	3	3	3
Wire cross section [mm ²]	0.14	0.14	0.14

MMS 30 sensor

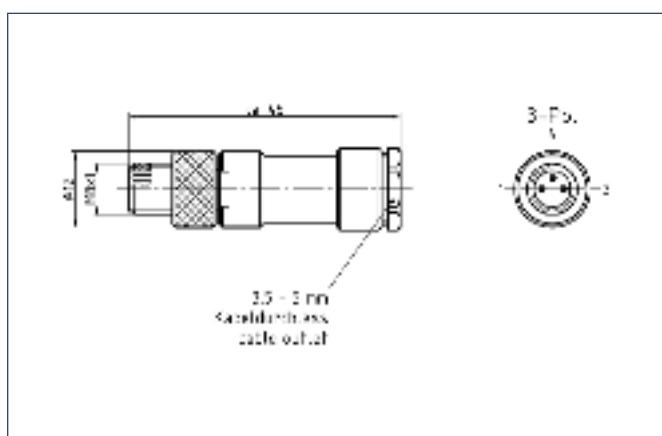
(72) Active sensor surface

M8 connector**M12 connector**

Accessories for Sensor Systems

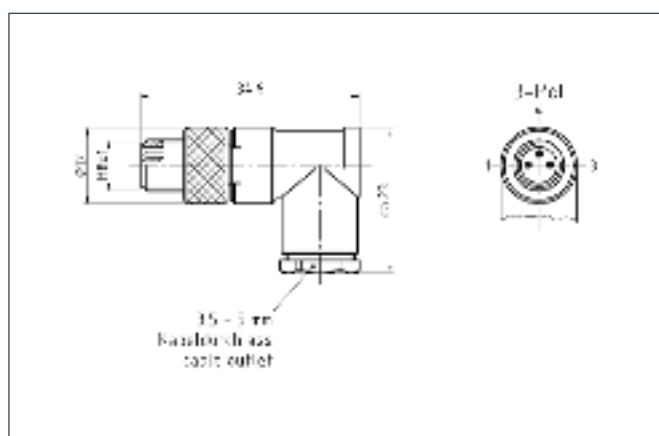
Accessories · Sensor Systems · M8 Connectors

Cable connectors ready for making up, straight



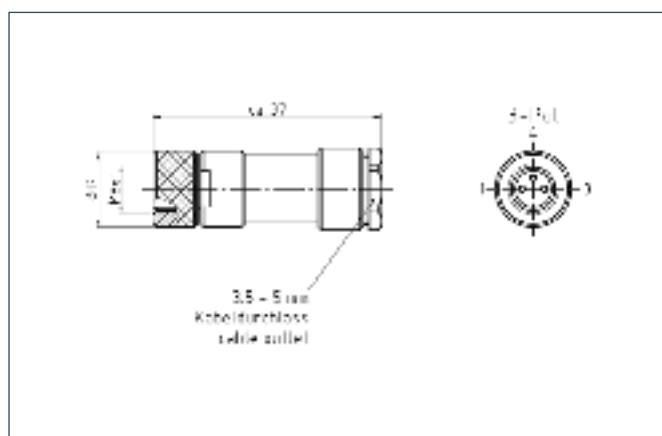
ID	0300050
Connection	3-pin
Maximum voltage [V]	60 AC / 75 DC
Maximum amperage [A]	4
Max. cross section for connection [mm ²]	0.25
Protection class	IP 67
Housing material	PA

Cable connectors ready for making up, right-angle



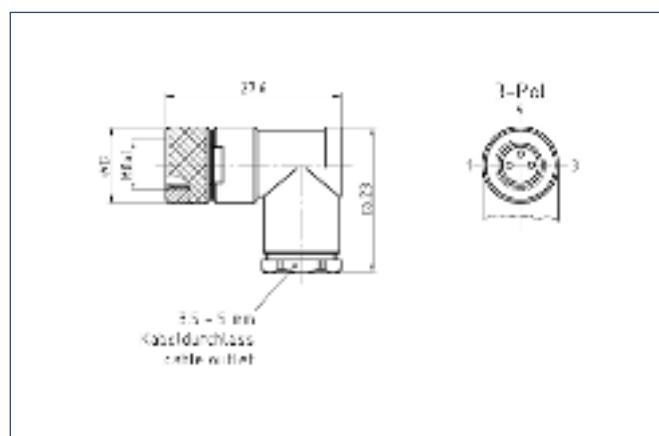
ID	0300051
Connection	3-pin
Maximum voltage [V]	60 AC / 75 DC
Maximum amperage [A]	4
Max. cross section for connection [mm ²]	0.25
Protection class	IP 67
Housing material	PA

Cable bushing ready for making up, straight



ID	0300052
Connection	3-pin
Maximum voltage [V]	60 AC / 75 DC
Maximum amperage [A]	4
Max. cross section for connection [mm ²]	0.25
Protection class	IP 67
Housing material	PA

Cable bushing ready for making up, right-angle

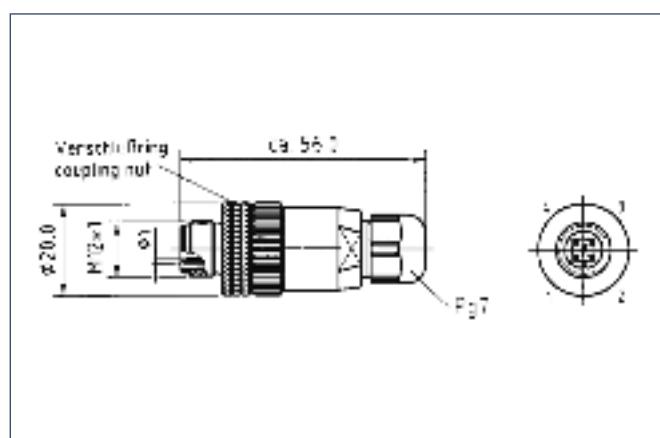


ID	0300053
Connection	3-pin
Maximum voltage [V]	60 AC / 75 DC
Maximum amperage [A]	4
Max. cross section for connection [mm ²]	0.25
Protection class	IP 67
Housing material	PA

Accessories for Sensor Systems

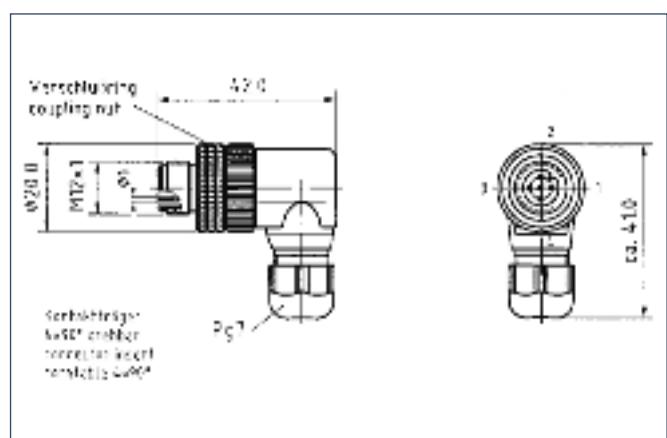
Accessories · Sensor Systems · M12 Connectors

Cable connectors ready for making up, straight



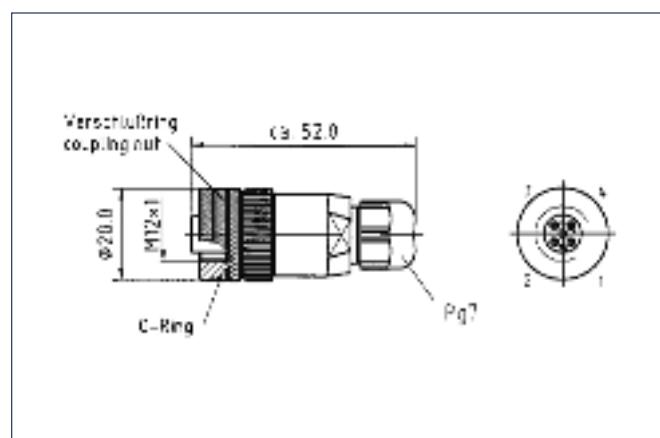
ID	0300060
Connection	4-pin
Maximum voltage [V]	250 AC / 300 DC
Maximum amperage [A]	4
Max. cross section for connection [mm ²]	0.75
Protection class	IP 68
Housing material	PA
Cable terminal area [mm]	Ø 2.5 – Ø 6.5

Cable connectors ready for making up, right-angle



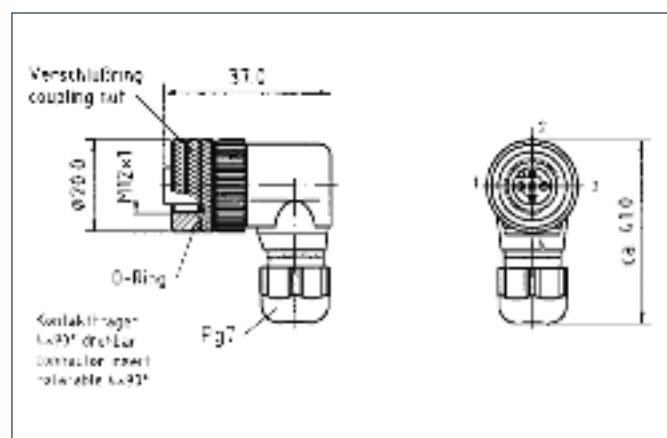
ID	0300061
Connection	4-pin
Maximum voltage [V]	250 AC / 300 DC
Maximum amperage [A]	4
Max. cross section for connection [mm ²]	0.75
Protection class	IP 68
Housing material	PA
Cable terminal area [mm]	Ø 2.5 – Ø 6.5

Cable bushing ready for making up, straight



ID	0300062
Connection	4-pin
Maximum voltage [V]	250 AC / 300 DC
Maximum amperage [A]	4
Max. cross section for connection [mm ²]	0.75
Protection class	IP 68
Housing material	PA
Cable terminal area [mm]	Ø 2.5 – Ø 6.5

Cable bushing ready for making up, right-angle

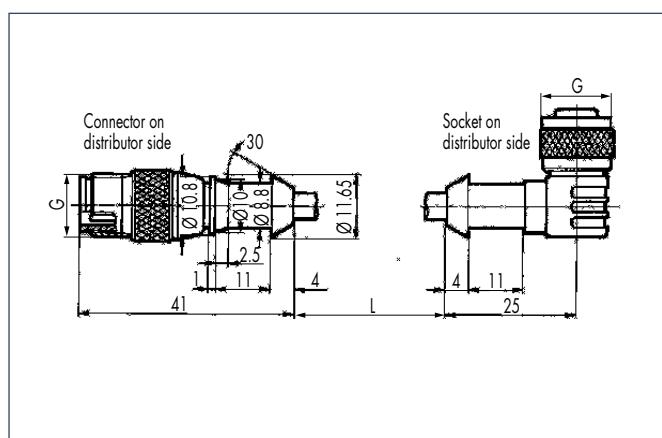


ID	0300063
Connection	4-pin
Maximum voltage [V]	250 AC / 300 DC
Maximum amperage [A]	4
Max. cross section for connection [mm ²]	0.75
Protection class	IP 68
Housing material	PA
Cable terminal area [mm]	Ø 2.5 – Ø 6.5

Accessories for Sensor Systems

Accessories · Sensor Systems

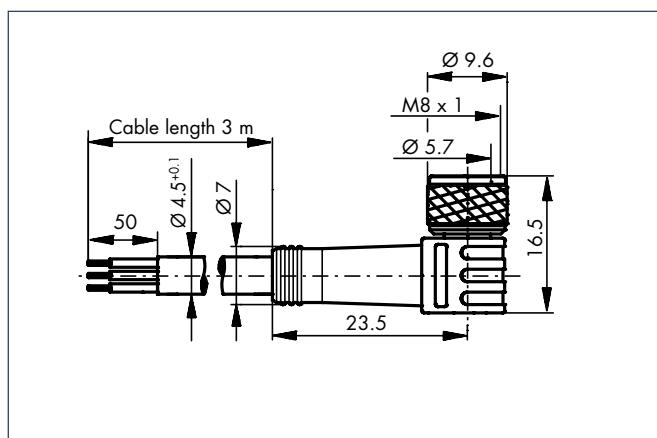
KV cable extensions for IN



KV cable extensions for IN proximity switches

Description	ID	Length L	Thread G
KV 3-M12	0301595	0.3 m	M12
KV 10-M12	0301596	1.0 m	M12
KV 20-M12	0301597	2.0 m	M12
KV 3-M8	0301495	0.3 m	M8
KV 10-M8	0301496	1.0 m	M8
KV 20-M8	0301497	2.0 m	M8

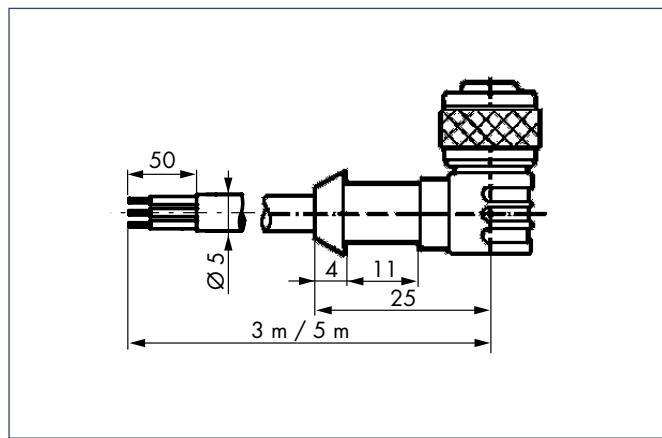
Feeder cable with WK right-angle plug



M8 connection, right-angle plug with 2 LEDs

Description	ID	Cable length
WK 3-M8	0301594	3 m
WK 5-M8	0301502	5 m
WK 3-M8 NPN	0301602	3 m
WK 5-M8 NPN	9641116	5 m

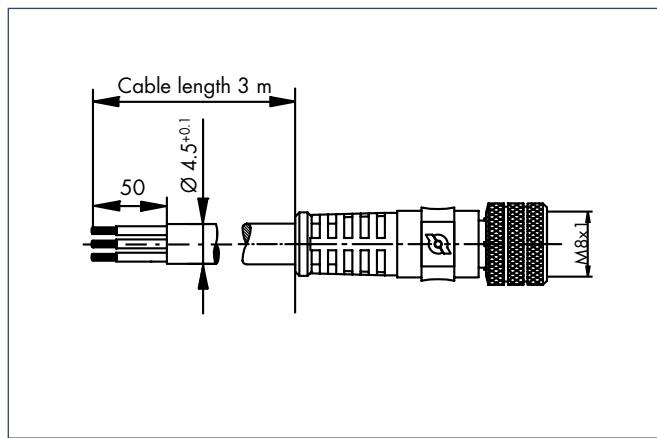
Feeder cable with W right-angle plug



M12 connection, right-angle plug with 2 LEDs

Description	ID	Cable length
W 3-M12	0301503	3 m
W 5-M12	0301507	5 m

Feeder cable with GK 3 straight plug



M8 connection, straight plug with 2 LEDs

Description	ID	Cable length
GK 3-M8	0301622	3 m

AKN connection cable



Connection cable with M8 or M12 screw terminal.
Suitable for IN-08-PNP and IN-12-PNP proximity switches.

Description	ID	Connector	Cable length
AKN-08-G-PU-05	0330649	M8 / straight	5 m
AKN-08-W-PU-05	0330657	M8 / right-angle	5 m
AKN-12-G-PU-05	0330650	M12 / straight	5 m
AKN-12-W-PU-05	0330658	M12 / right-angle	5 m

Hybrid cable for PG/PR/PW/PDU/PSM

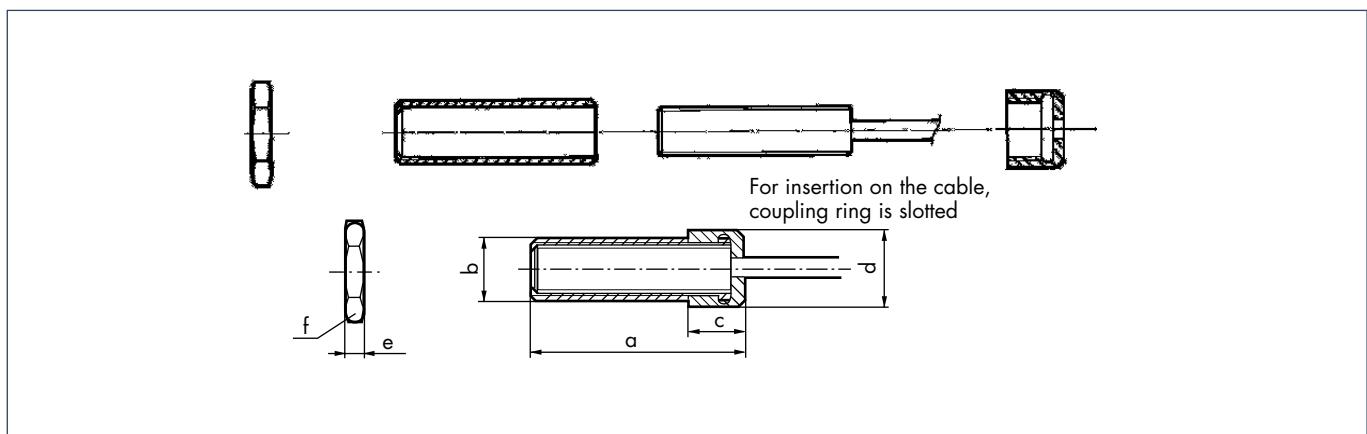


Interconnecting cable for the electrical connection of modules from the PowerCube series

Description	ID	Basic length	Extended length
PowerCube hybrid cable spiraled	0307753	0.3 m	0.8 m
PowerCube hybrid cable spiraled	0307754	0.46 m	1.5 m
PowerCube hybrid cable straight	9941120	by the meter	-



Adjustable housing for proximity switches



Description	NHG 5	NHG 8
ID	9646006	9646007
Suitable for types	M5 x 0.5 x 25	M8 x 1 x 32
a	27	34.5
b	M8 x 1	M10 x 1
c	8.5	8.5
d	10	12
e	4	2.8
f	SW 13	SW 14

Advantages of the NHG

- Setting only has to be carried out once
- Faulty switches can be replaced quickly
- Corrosion-free material
- Setting does not have to be changed if proximity switch is replaced
- Switches are protected against mechanical influences

Sensor tester

The sensor tester enables the rapid testing and adjustment of inductive sensors, magnetic switches and reed contacts. The necessary power is supplied by a 9 V compound battery.

**Function description**

The sensor is connected to the M8 - M12 or terminal connection of the sensor tester and the ON button pressed. The sensor status is displayed visually by LEDs and output acoustically via a signal buzzer.

Your advantages and benefits**Visual and acoustic signal**

for simple function checks and adjustment

For 2 and 3-wire DC technology

enabling the connection of reed contacts, capacitive and inductive sensors

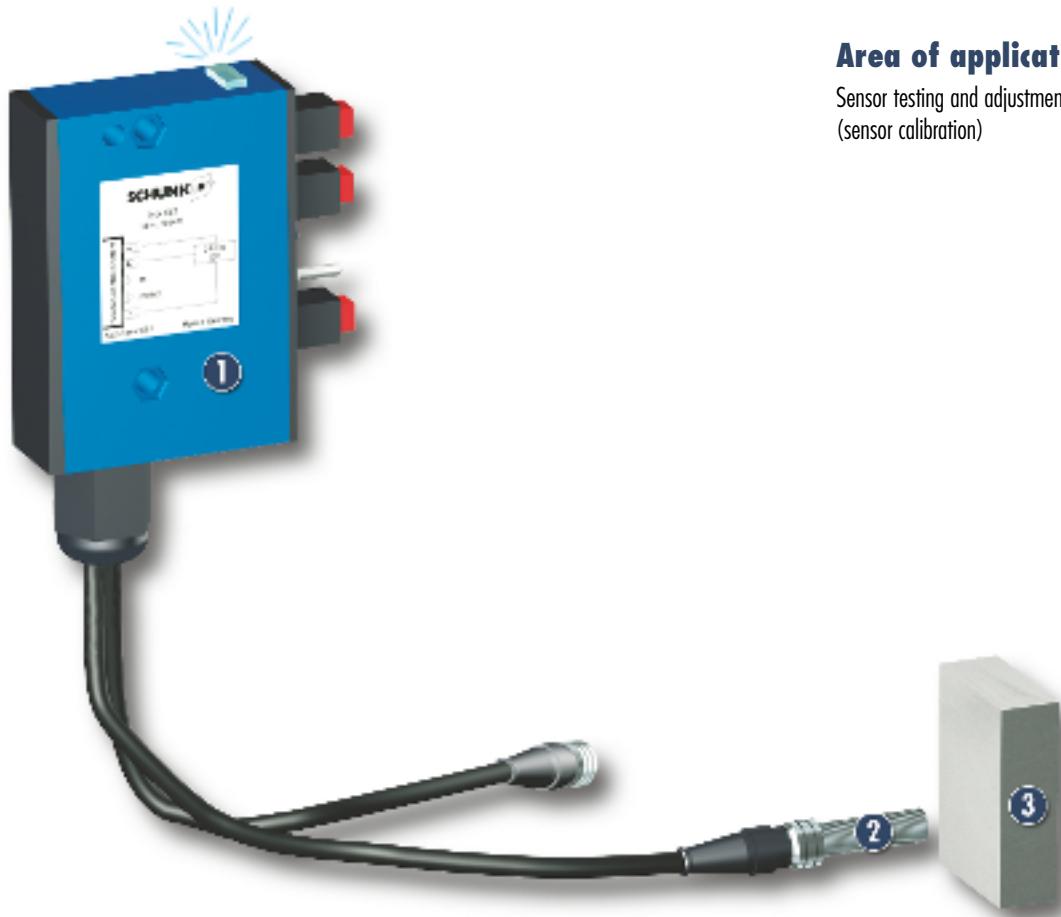
Tests possible without dismantling sensors

for short maintenance times

Connections for M8 and M12 or open cable ends possible
suitable for all SCHUNK sensors**PNP and NPN sensors can be tested****Operating voltage with 9 V compound battery**
for mobile use**Automatic cut-off function**

for an extended battery life

Application example



1 SST Sensor Tester

3 Metal plate

2 IN 80 Inductive Proximity Switch

General information

Scope of delivery

Sensor tester incl. assembly and operating manual with manufacturer's declaration,
9 V compound battery

Notes

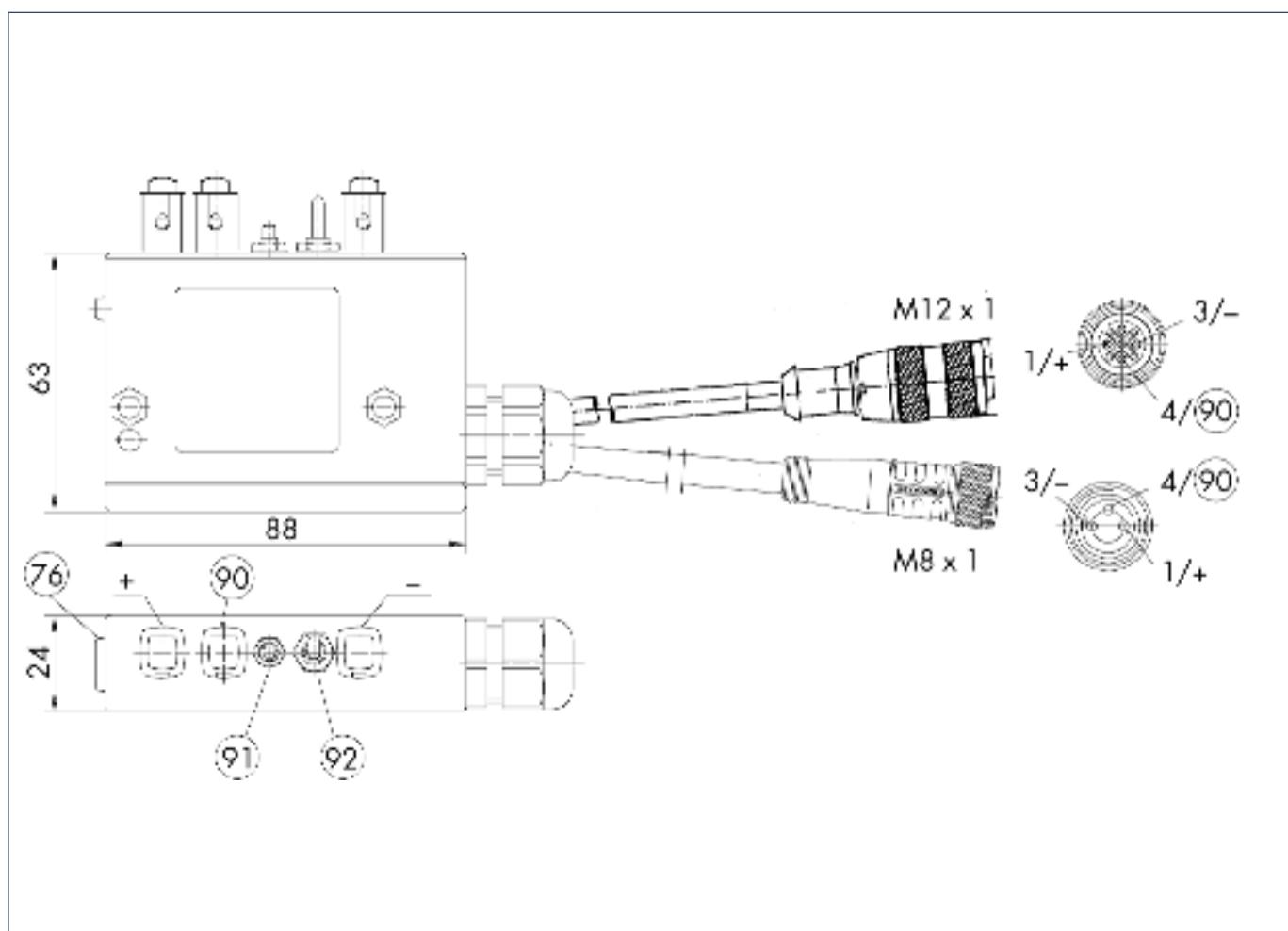
Please note that only one SST input (M8 or M12 or cable terminal input) can be used at one time.

If the toggle switch is towards the sticker (nameplate), PNP is selected, if not, NPN.



Technical data

Description	SST
ID	0301400
Battery	9 V DC (battery type LR 61)
Connection 1	M12*1
Connection 2	M8*1
Connection 3	Direct termination
Housing material	Plastic
IP rating	20

Main views

- ⑦6 LED
- ⑨0 Output
- ⑨1 ON button
- ⑨2 PNP / NPN changeover switch

Sensor Distributor

For connecting all SCHUNK sensors and sensor systems (IN/INK/MMS, etc.). In the versions 2 (V2), 4 (V4) and 8 (V8).



Function description

Distributors collect incoming signals and forward them in a single cable. This eliminates unnecessary cables. The switching state of the connected components can be checked by the LEDs integrated in the distributor.

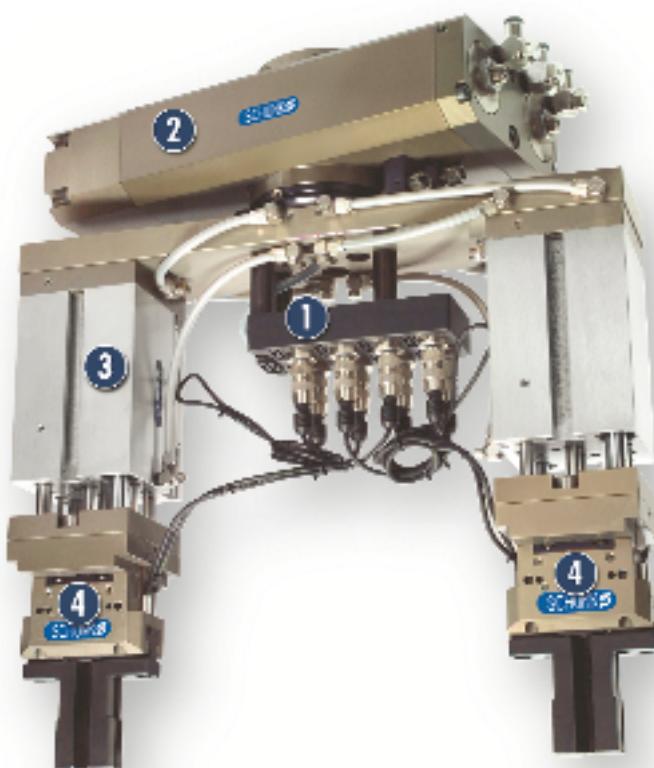
Your advantages and benefits

Status and switching display via LED
for directly checking the switching state

One feeder cable
making it ideal for feeding through signals

Sturdy PA housing
for a long life and resistance to many chemicals

Application example



Area of application

Sensor distributors from SCHUNK are universal and resistant to vibration, dust and humidity. They are therefore suitable for use in both clean and dirty environments.

- 1** V 8 Sensor Distributor
- 2** SRU 63 Flat Rotary Actuator
- 3** PHE Stroke Module
- 4** PGN 2-Finger Parallel Gripper with workpiece-specific Gripper Fingers

General information

Materials

Housing: PA 6 GF 30, black
Cable: PUR sheathing

Mounting

with screws

Protection class to DIN 40050

IP 67 when connected

Scope of delivery

Complete incl. sealing plugs for sealing unused connections, 1 set of labels

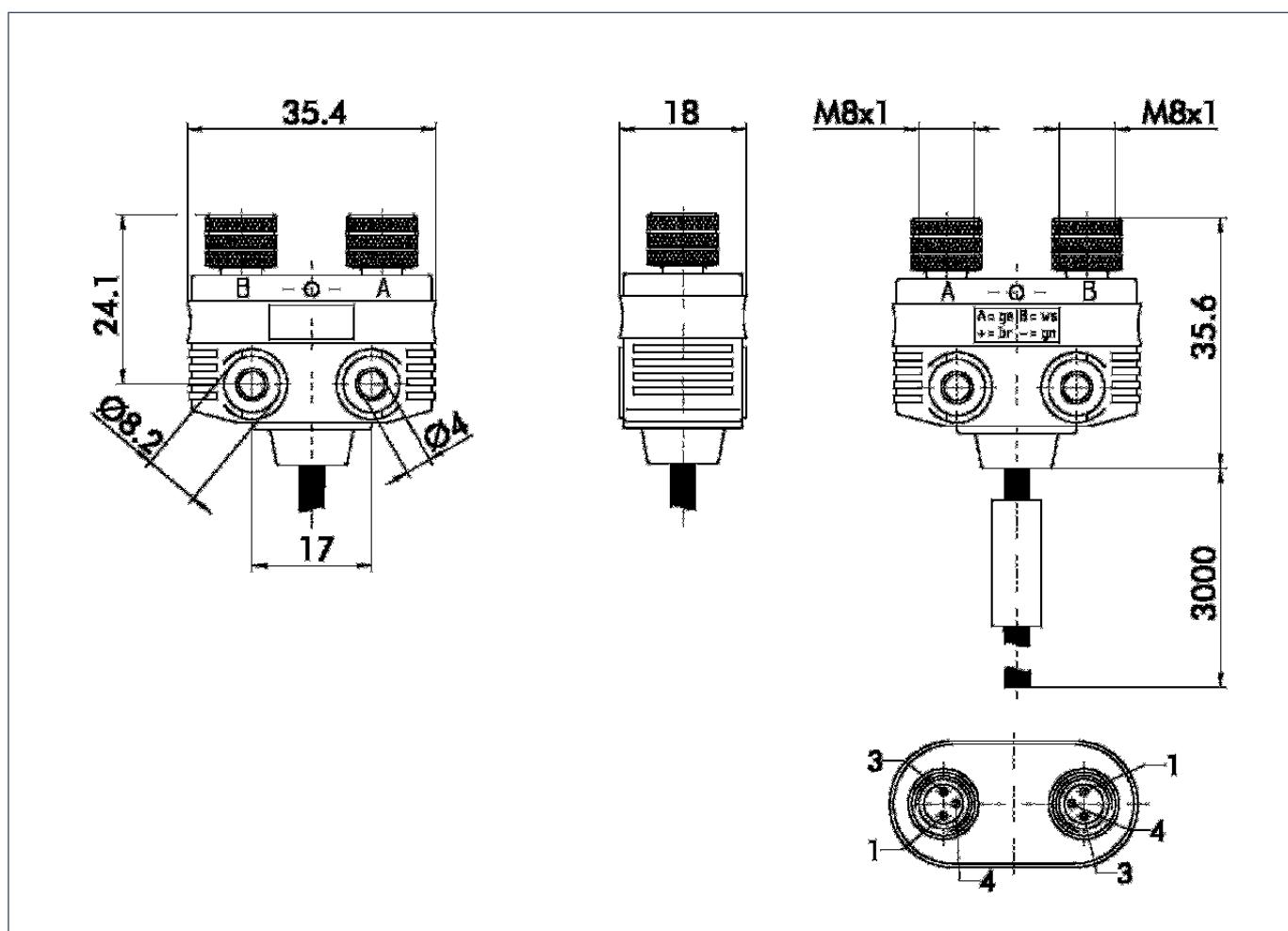
Warranty

24 months

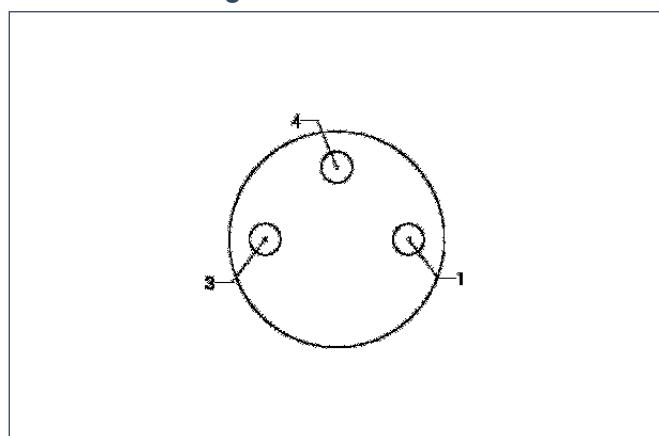
**Technical data**

Description		V 2-M8	V 2-M12
	ID	0301900	0301589
Socket		M8*1	M12*1
Cable length	[m]	3.0	3.0
Nominal voltage	[V]	24.0	24.0
Min. voltage	[V]	10.0	10.0
Max. voltage	[V]	30.0	30.0
Max. current per wire	[A]	2.0	2.0
Max. overall current		2.0	2.0

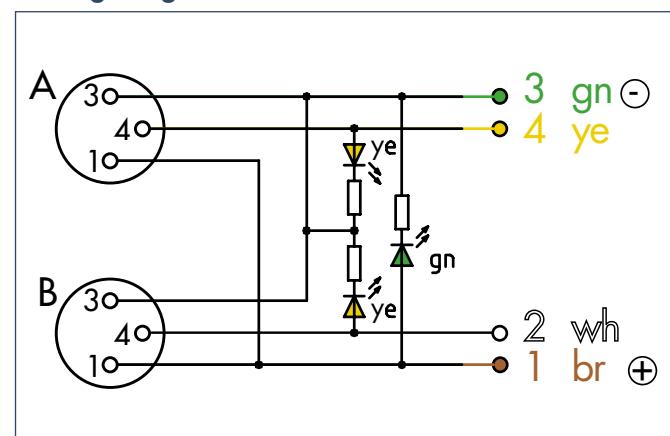
Main views of the V 2-M8



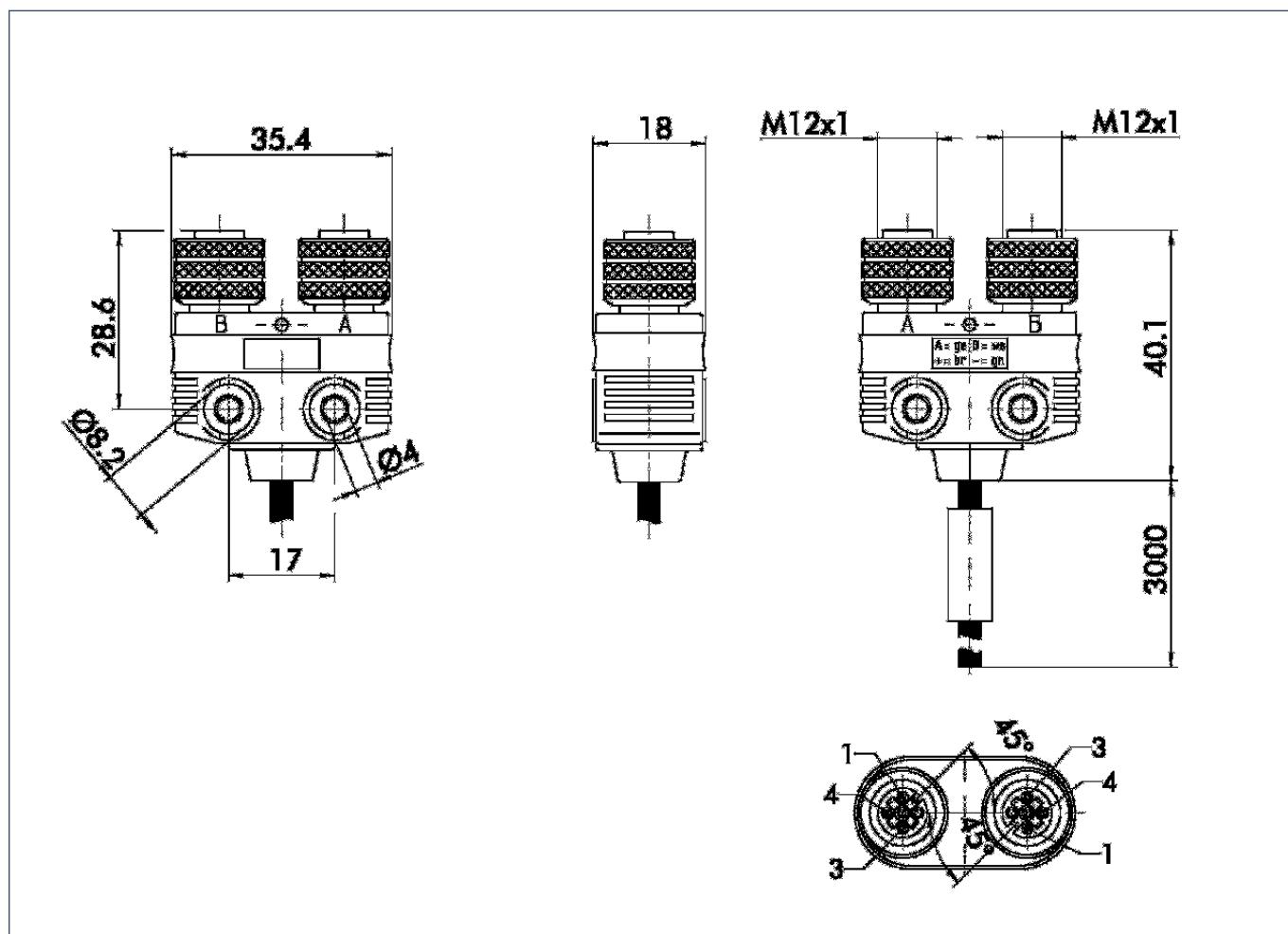
M8 contact assignment



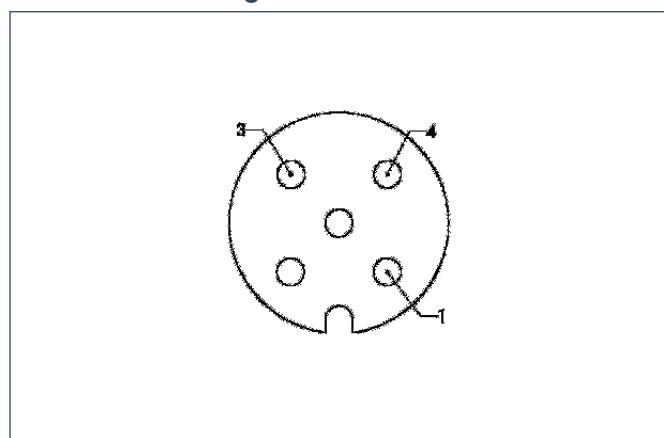
Wiring diagram



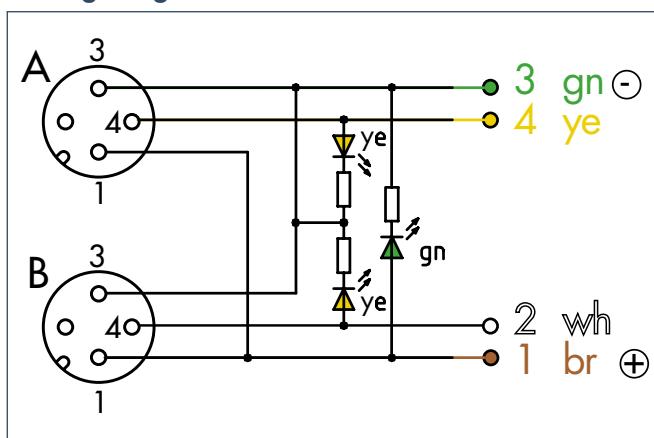
Main views of the V 2-M12

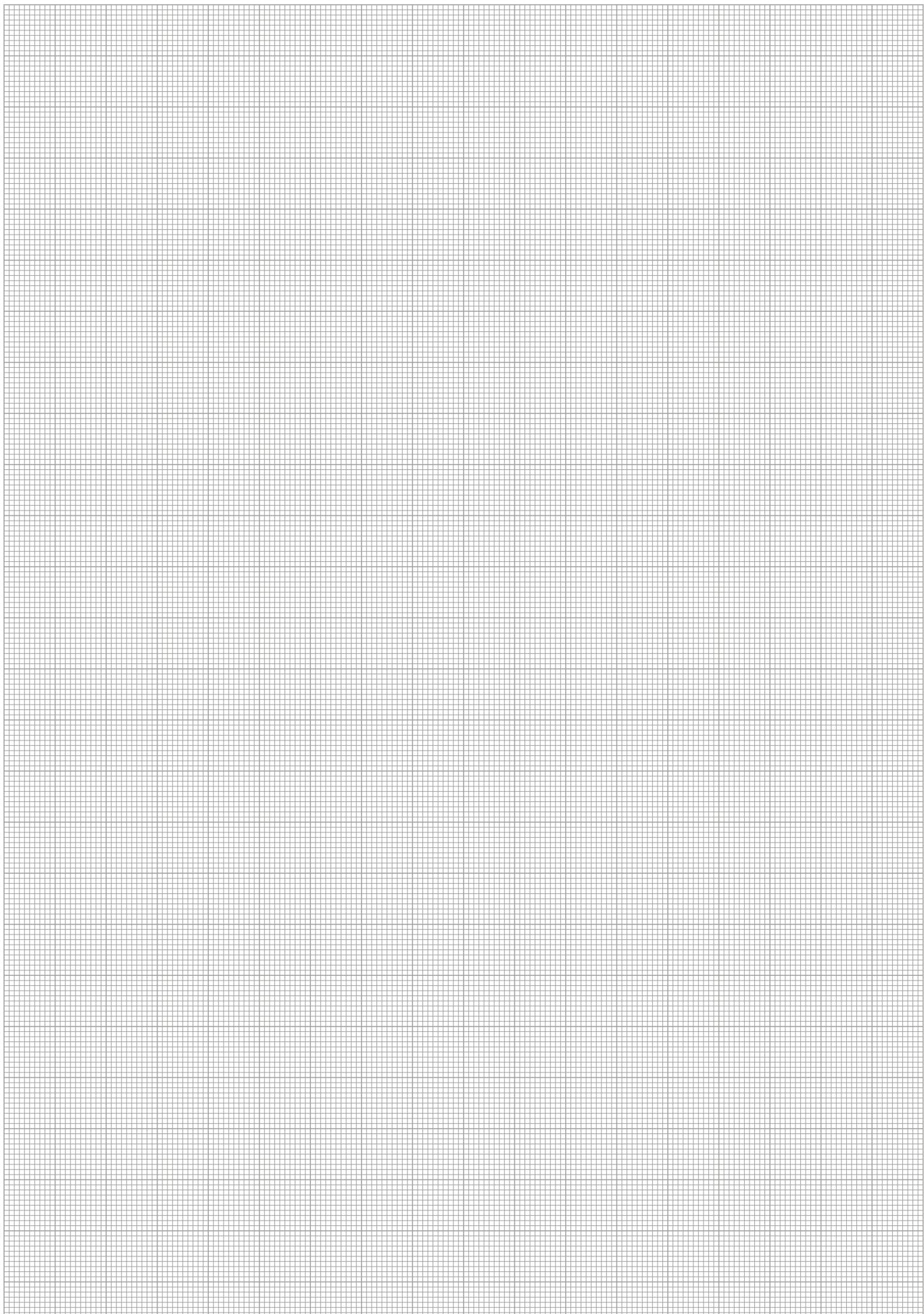


M12 contact assignment



Wiring diagram



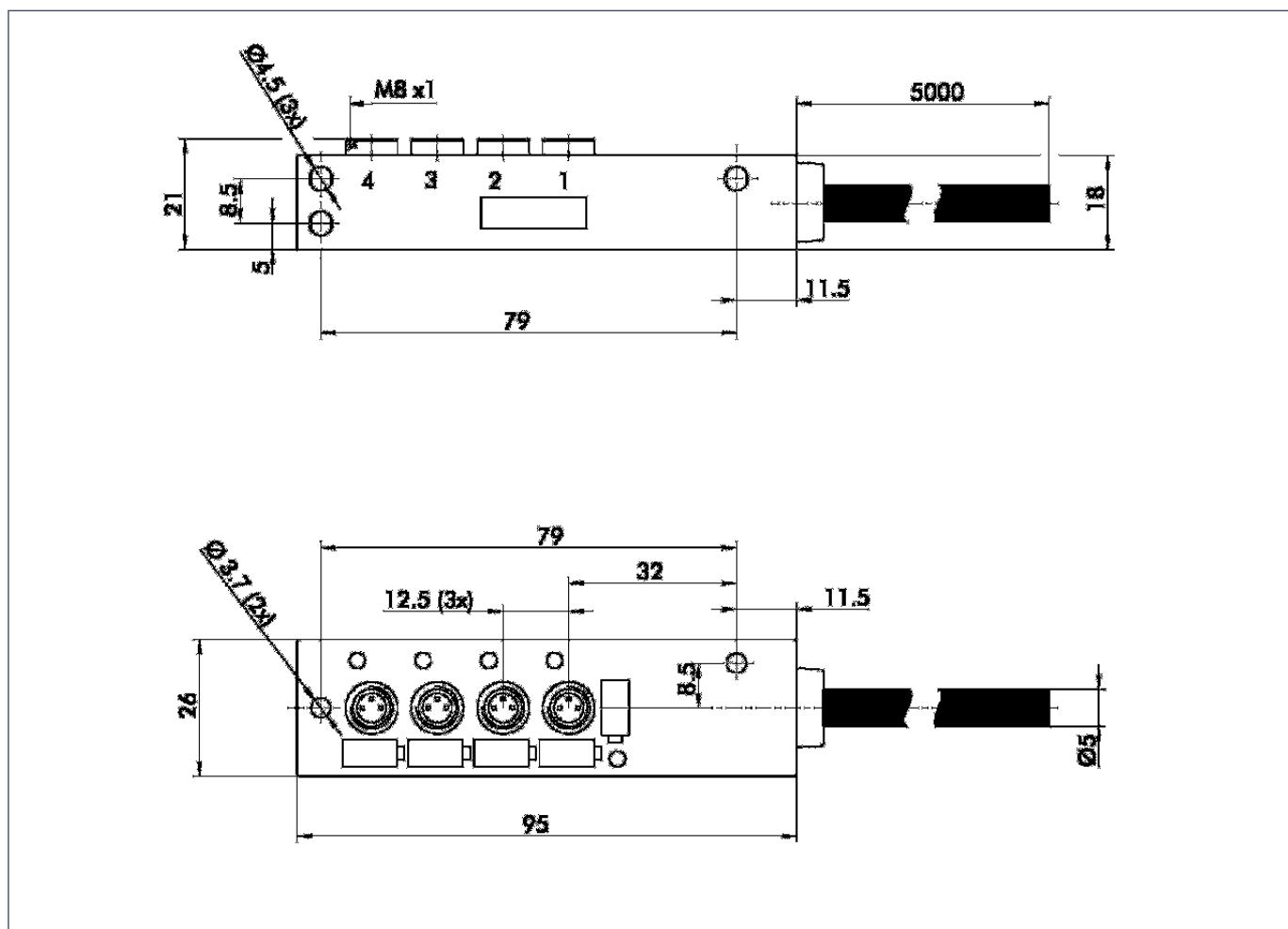




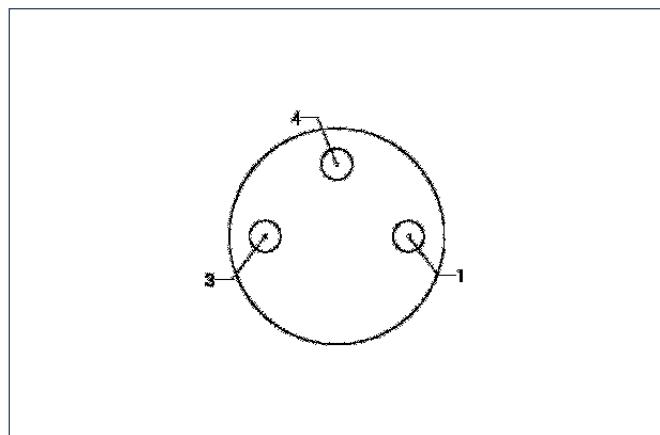
Technical data

Description	V 4-M8	V 4-M12
ID	0301904	0301902
Socket	M8*1	M12*1
Cable length	[m]	3.0
Nominal voltage	[V]	24.0
Min. voltage	[V]	10.0
Max. voltage	[V]	30.0
Max. current per wire	[A]	2.0
Max. overall current		2.0

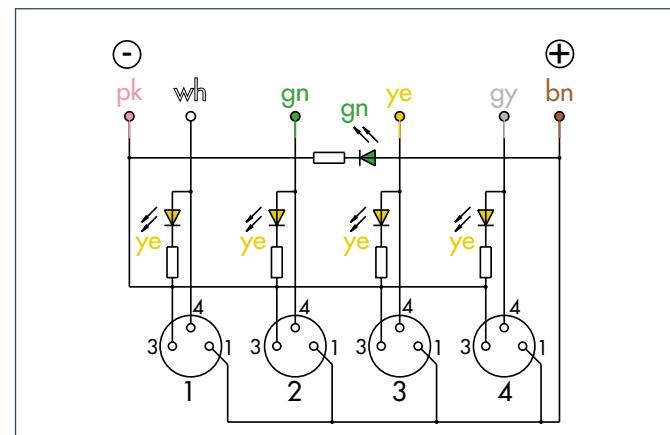
Main views of the V 4-M8



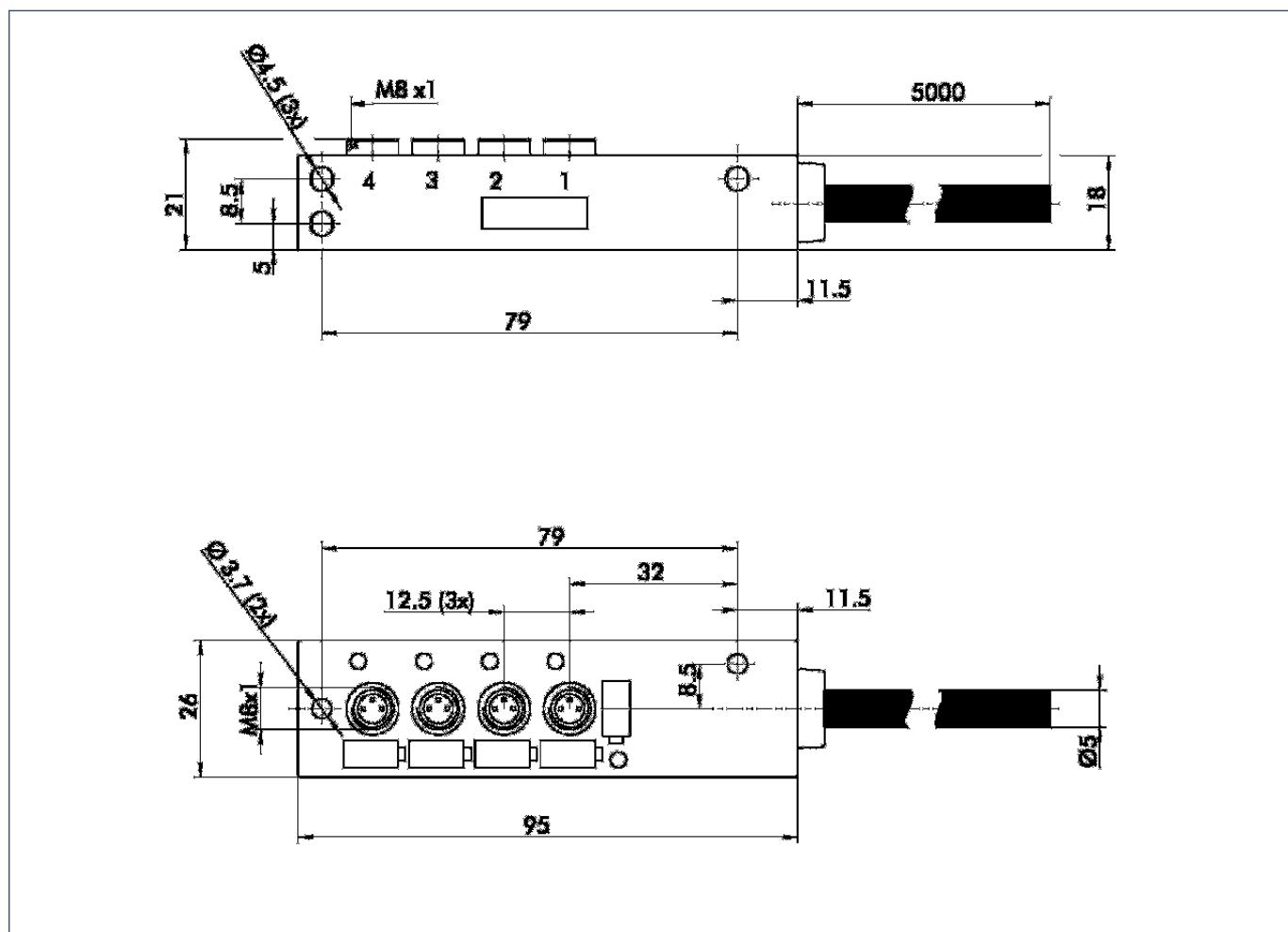
M8 contact assignment



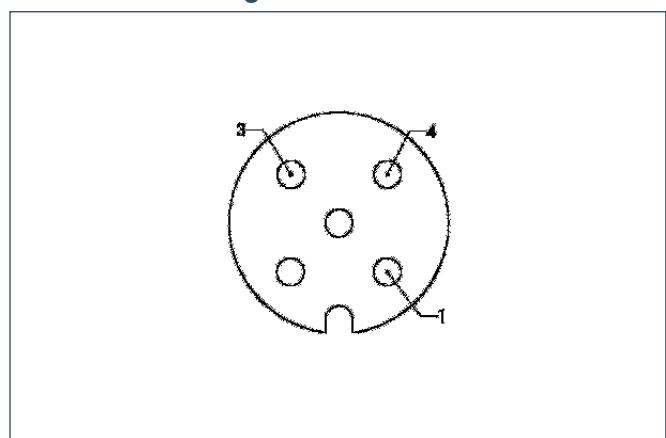
Wiring diagram



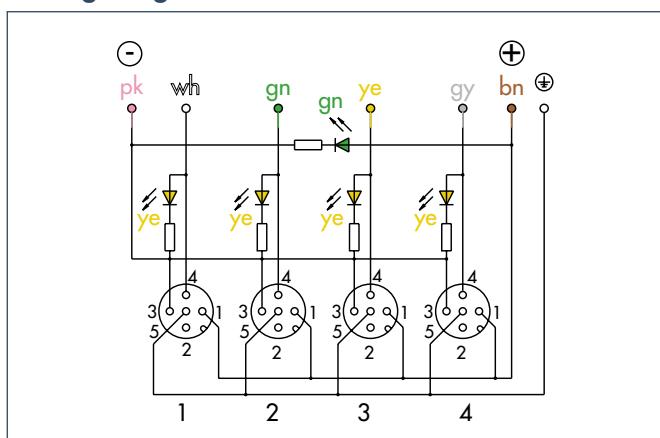
Main views of the V 4-M12

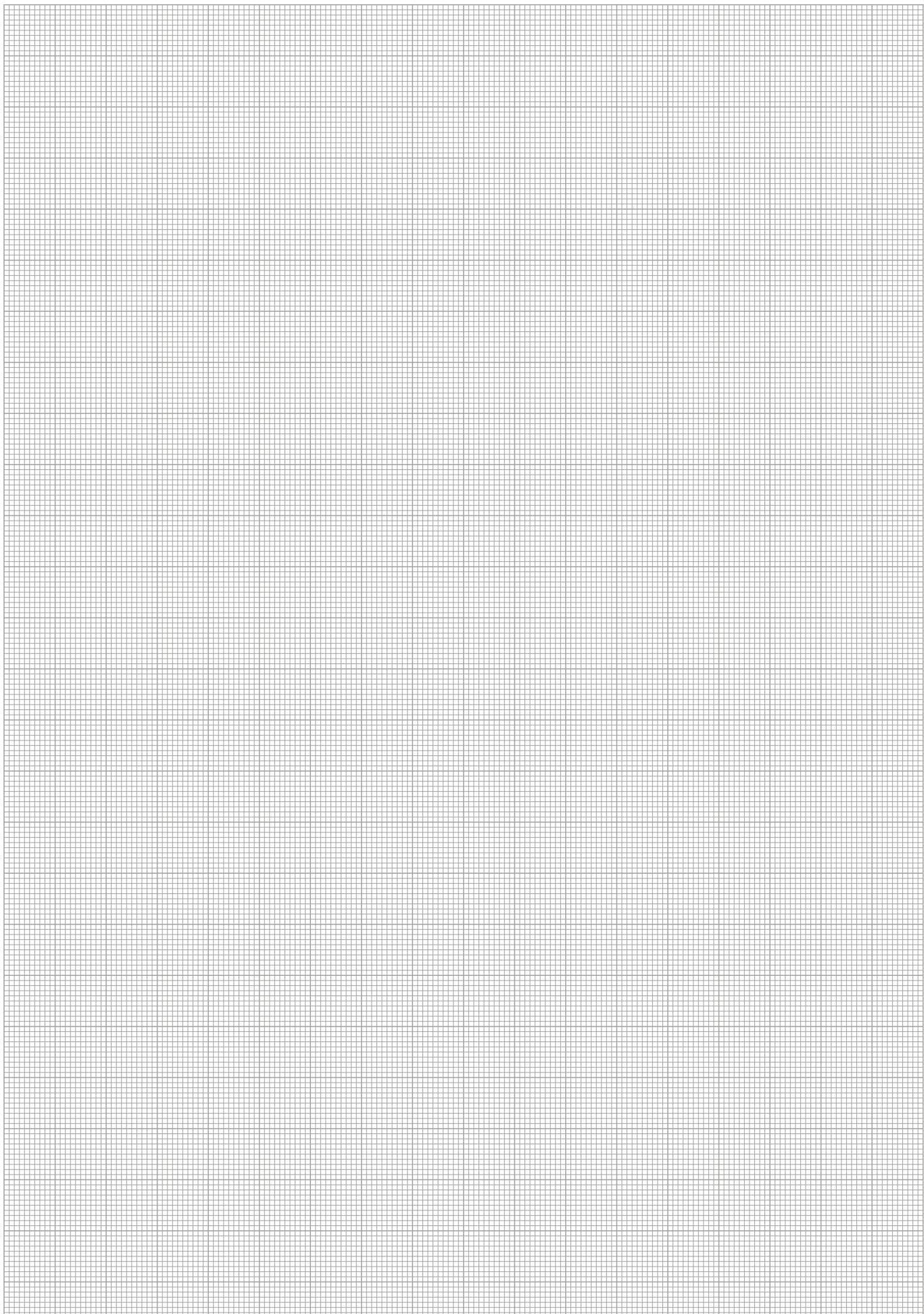


M12 contact assignment



Wiring diagram



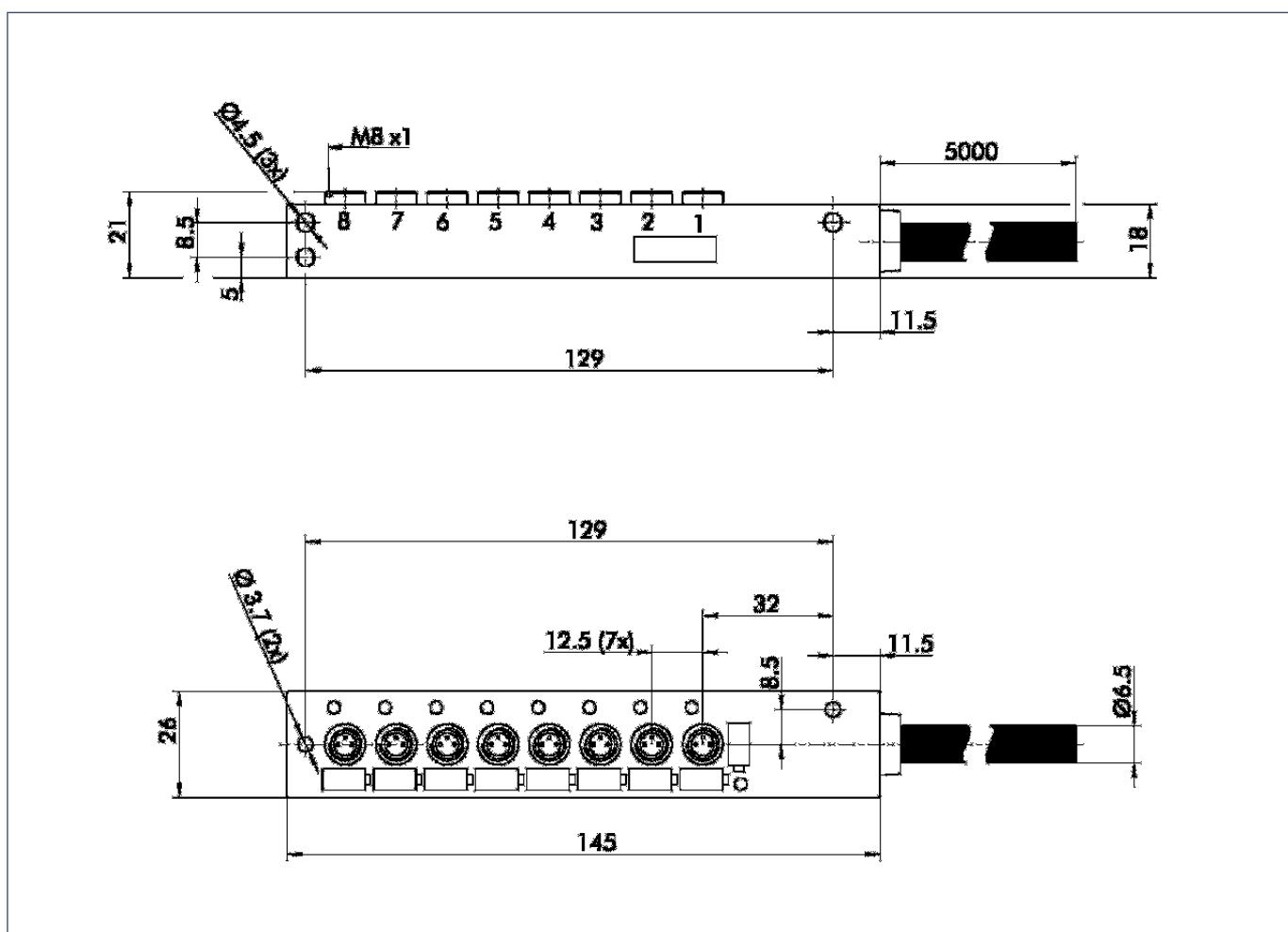




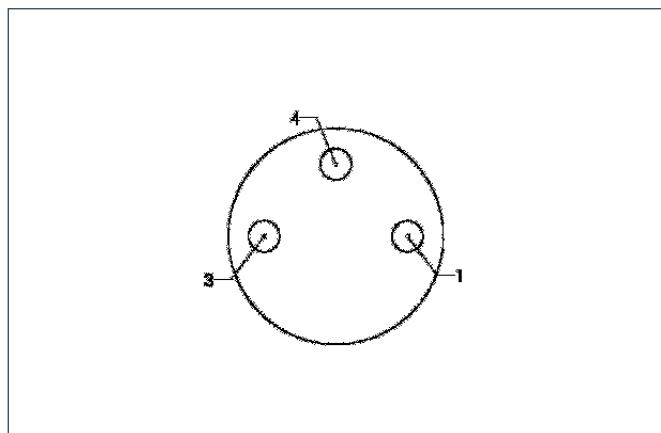
Technical data

Description	V 8-M8	V 8-M12
ID	0301906	0301590
Socket	M8*1	M12*1
Cable length	[m]	3.0
Nominal voltage	[V]	24.0
Min. voltage	[V]	10.0
Max. voltage	[V]	30.0
Max. current per wire	[A]	2.0
Max. overall current		2.0

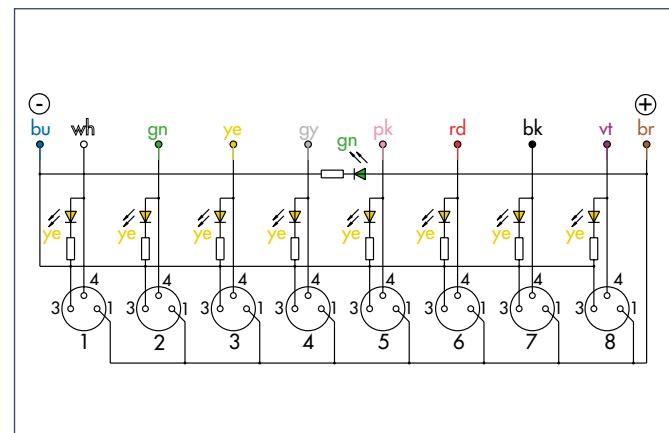
Main views of the V 8-M8



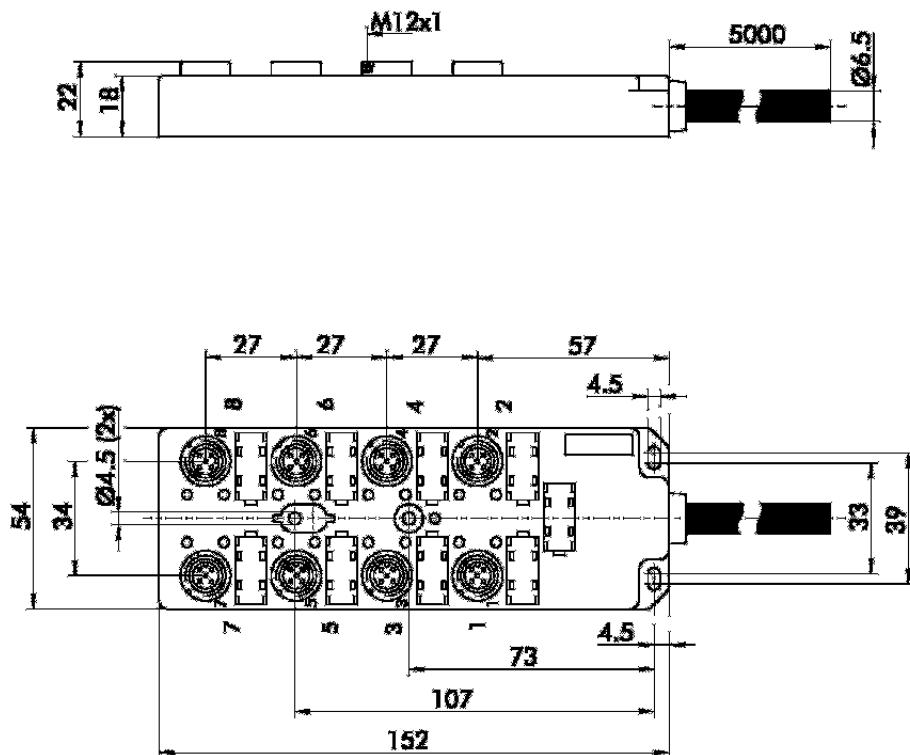
M8 contact assignment



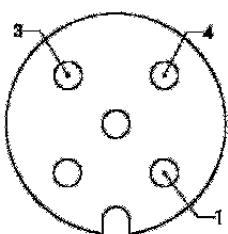
Wiring diagram



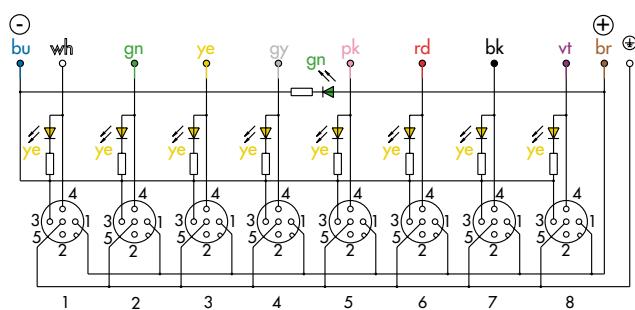
Main views of the V 8-M12

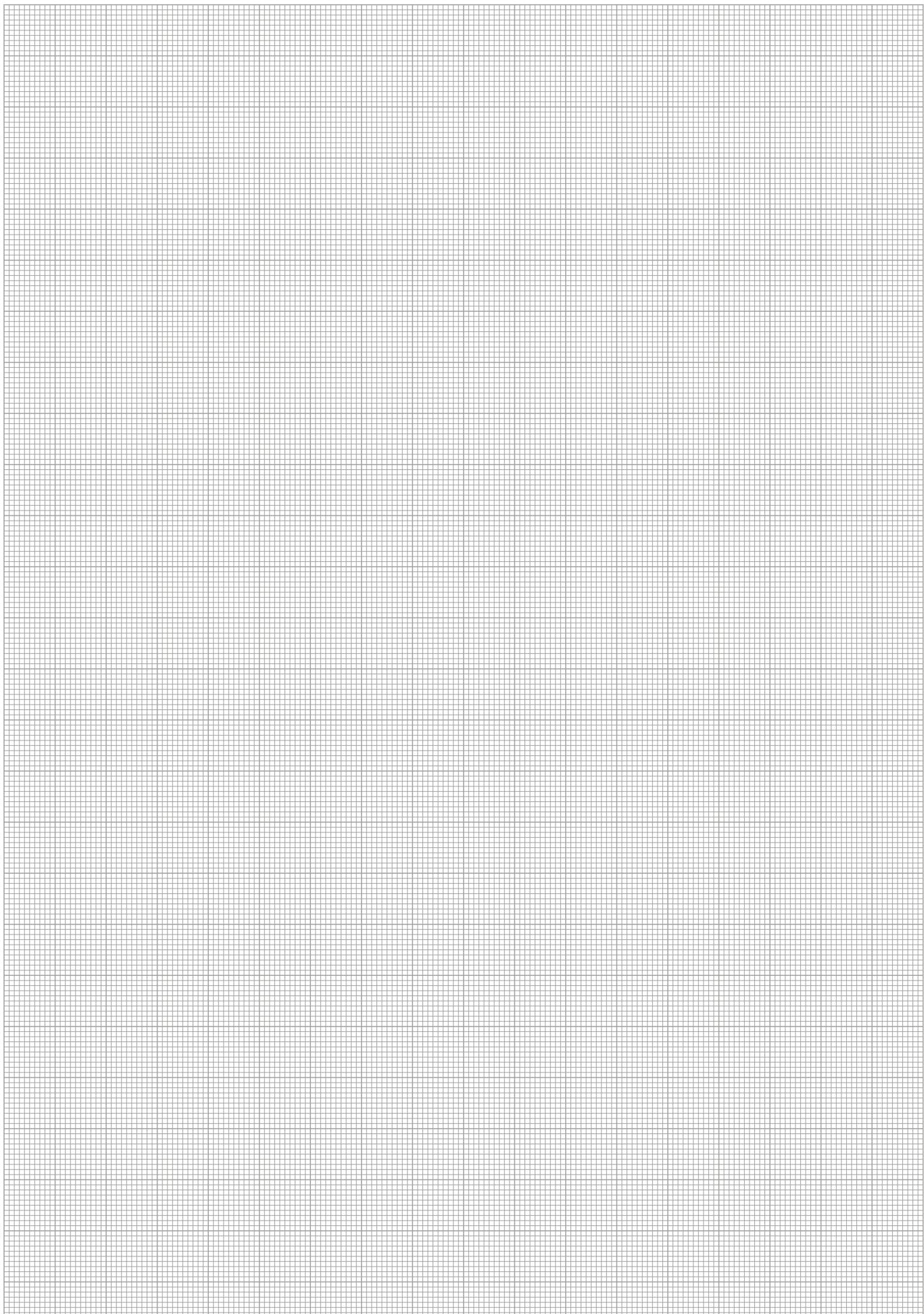


M12 contact assignment



Wiring diagram





FPS Flexible Position Sensor

The optional FPS sensor system measures the position of gripper jaws. It then indicates in which of the five freely teachable zones the jaws currently are. Alternatively, the jaw position can be read out via the "FPS Controller" software (FPS-F5/ F5T only).



Function description

A permanent magnet that moves with the base jaw provides the FPS sensor with its magnetic field. The strength of this permeation changes depends on the distance of the magnet from the sensor. This variable is recorded, evaluated and output by the FPS electronic processor.

Your advantages and benefits

Simplest operation

with just two buttons, or with the machine control system using free control lines

Simple start-up

as the customer can set all positions during the teaching operation

Five digital outputs

for greater economy as compared to individual sensors

Small distance between two switching points, adjustable

Resistant to contamination

through non-ferromagnetic materials

Function and switching status display

via LEDs on the electronic processor

Conforms to CE

for safety and long life during permanent operation

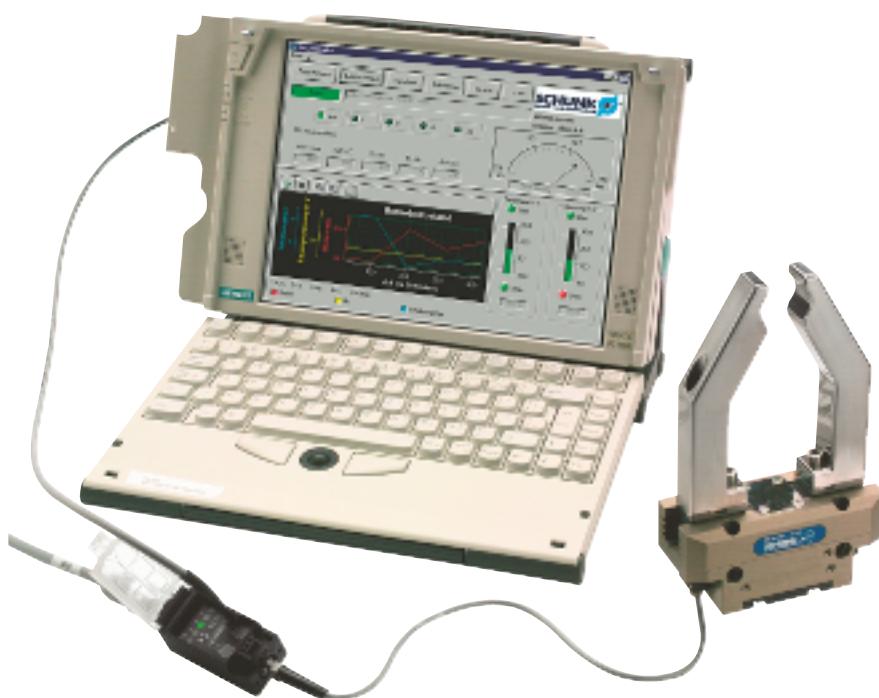
Digital technology

for resistance to interference

Additional advantages of the FPS-F5 and F5 T

- Measuring functionality
- Communication and remote maintenance via RS-232 protocol
- Position programming and readout of switching points
- Monitoring of temperature and input voltage
- Visualization via PC possible
- Data logging
- Calibration of system to gripper stroke
- Intelligent access authorization
- Adaptation to new product during the process

Application example



Area of application

Position sensing of gripper jaws up to a stroke of approx. 30 mm in environments that may be clean or dirty, but are free from steel chips.



General information

Resolution

The resolution is the minimum stroke difference that is required in order to reliably distinguish between two signals. Used in conjunction with most SCHUNK grippers, the FPS system achieves a resolution of 1 – 3 % of a jaw stroke. However, in some grippers a resolution of only 10 % is achieved due to the nature of the design. More precise resolutions may be reached, however, with the use of special solutions. Please contact us regarding the resolution/accuracy of the FPS system.

Connector for the electronic processor (enclosed)

12-pin circular connector (Binder type series 723, waterproof) suitable for connection cables with a diameter of 6 to 8 mm, recommended conductor cross-section 0.14 mm² (max. 0.25 mm²)

Ambient conditions

Use within the range of strong magnetic fields is not recommended. Neither the FPS sensor nor the FPS magnet may come into contact with ferromagnetic dust, chips or other substances.

Display

Five colored LEDs

Range of measurement

5 to 30 mm with SCHUNK magnet (NdFeB magnet cut to size, dimensions 6 x 25 mm x L) with various lengths L depending on the part of the range of measurement

Material

Processor: Plastic PA 6

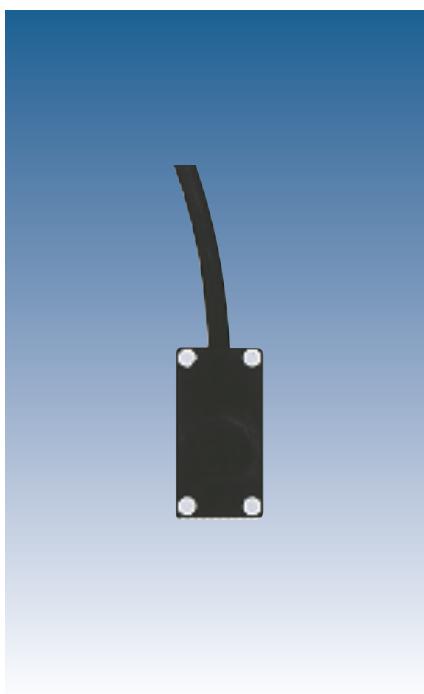
Cable: PU, resistant to coolants/lubricants

Warranty

24 months

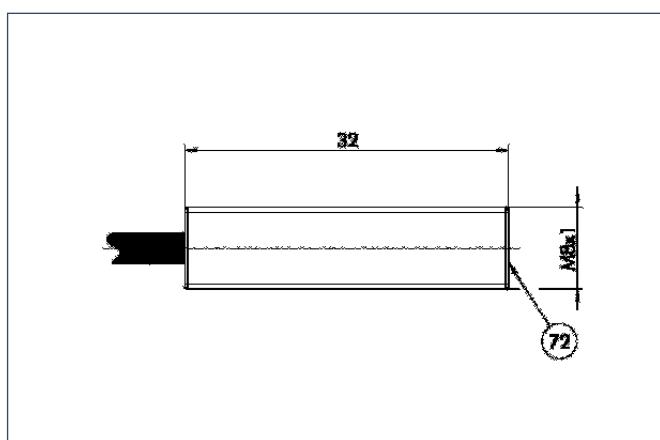
Notes

All data were determined on the basis of SCHUNK attachments and specifications. Please consult us regarding use of the sensor with modules from other manufacturers.

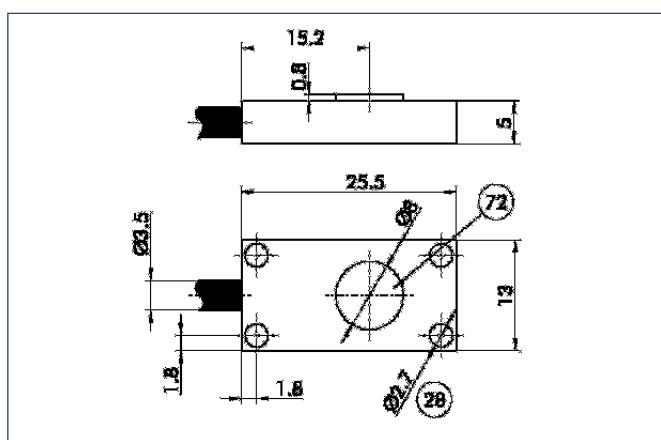
FPS sensors

Either the FPS-S13 or the FPS-SM8 sensor is required, depending on the type of gripper. Each sensor is connected to its own FPS-A5/F5/F5T processor.

Description	FPS-S 13	FPS-S M8
ID	0301705	0301704
Cable diameter [mm]	3.5	3.5
Cable length [cm]	30.0	30.0
Connection of FPS on processor side	M8	M8
Weight [kg]	0,01	0,015
Min. ambient temperature [°C]	-25.0	-25.0
Max. ambient temperature [°C]	70.0	70.0
IP rating (sensor)	65	65
IP rating (connector, plugged in)	65	65
Min. bending radius (dynamic) [mm]	17.5	17.5
Min. bending radius (static) [mm]	35.0	35.0

S-M8 sensor

(72) Active sensor surface

S13 sensor

(28) Through-bore

(72) Active sensor surface

**Cable extensions**

Max. extension between FPS sensor and electronic processor for trouble-free operation: 1 m

Description	ID	Length
KV 05	0301598	0.5 m
KV 1	0301599	1.0 m

FPS-A5/FPS-F5 Processor

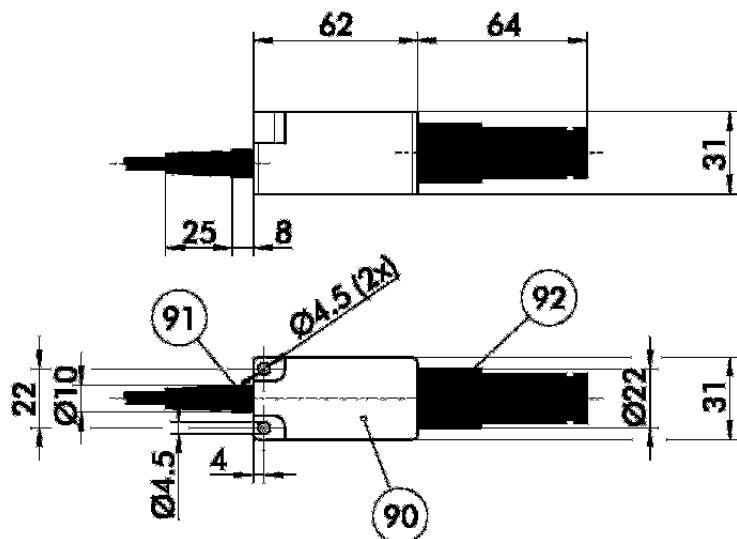
Measurement of the gripper stroke using sensors, assignment to the positions/zones "Open", "Intermediate position 1,2,3" or "Closed", and output of a position signal. A maximum of four switching points/five zones are freely programmable. FPS-F5 additionally with RS-232 interface, remote maintenance, measuring functionality, system calibration to the millimeter, temperature and voltage monitoring.

FPS-F5T processor

Measurement of the gripper stroke using sensors, comparison with target value, output of tolerance information "Within tolerance", "Above tolerance" or "Below tolerance", plus "Open" and "Closed". Otherwise, like the FPS-F5.

Description		FPS-A5	FPS-F5	FPS-F5 T
	ID	0301802	0301805	0301807
Nominal voltage	[V]	24.0	24.0	24.0
Min. voltage (DC)	[V]	10.0	10.0	10.0
Max. voltage (DC)	[V]	30.0	30.0	30.0
Nominal current (DC)	[A]	0.01	0.01	0.01
Weight	[kg]	0.06	0.06	0.06
Min. ambient temperature	[°C]	-25.0	-25.0	-25.0
Max. ambient temperature	[°C]	70.0	70.0	70.0
IP rating		65	65	65

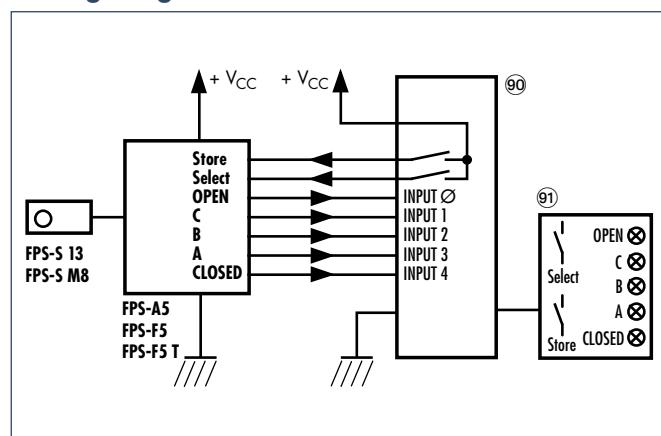
Main views



- ⑨₀ Transparent plastic cover, over control and display panel
- ⑨₁ Connector on sensor side
- ⑨₂ Connector on control cabinet side



Wiring diagram



⑨₀ SPC/PLC

⑨₁ Machine panel (provided by customer)

For the contact assignment of the connections on the PLC side, please refer to the user's manual.

Cable extension (open wires)

From the electronic processor to the control cabinet

Description	ID	Length
KV 10	0301801	10.0 m

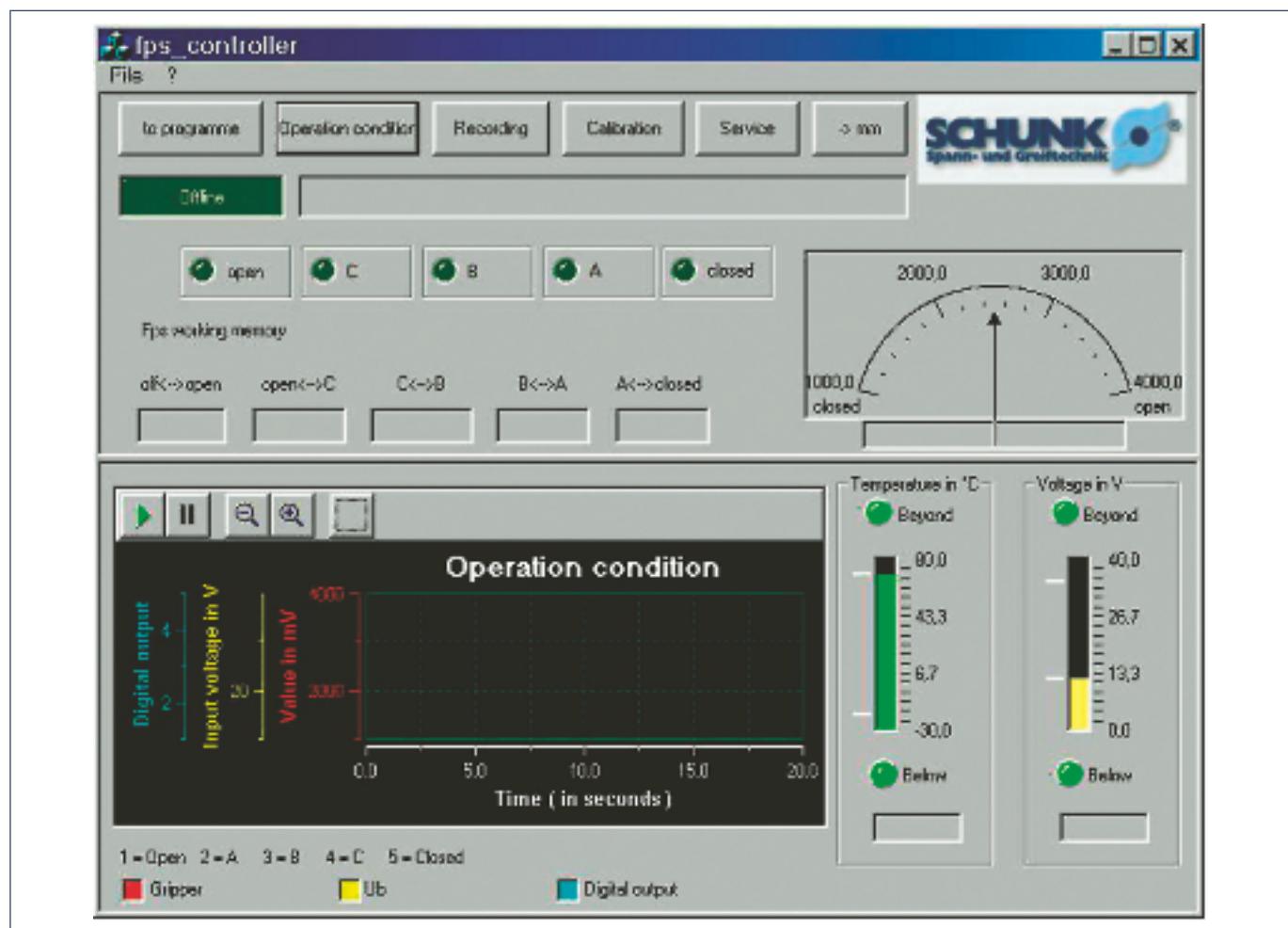
Software for FPS-F5/F5 T



The free FPS Controller software allows the user to monitor the FPS processor via an RS-232 interface. As a result, the FPS system can be calibrated to stroke measurement, the position can be read out and the FPS processor can be programmed. The FPS software also provides access to all auxiliary functions (see above).

Description	Software
ID (CD)	0301806
Download	www.schunk.com
Operating system	MS Windows

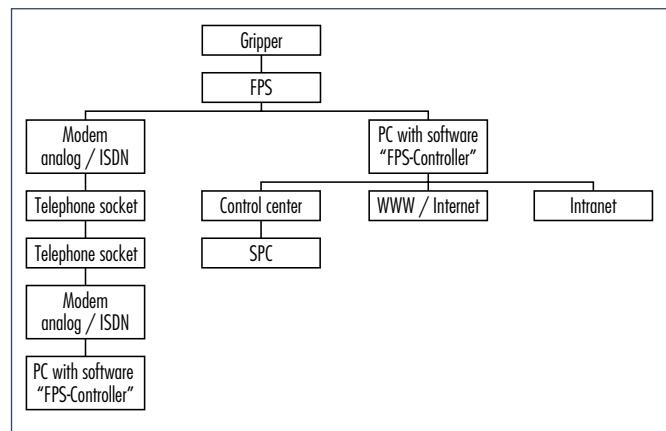
Screenshot software



Set-up with laptop



Possible connection methods



Analog Position Sensor System

Mechanical, analog system comprising sensor and processor for accurately recording the position of gripper jaws.



Function description

The high-resolution APS-M1S sensor is actuated by an inclined surface (mounting kit), which is attached to the gripper base jaw. The changes in position of the sensor are recorded, amplified, prepared and made available to an analog output by the APS-M1E processor.

Your advantages and benefits

Position output
as voltage (V) or current (mA)

Precise measuring system
also for long strokes

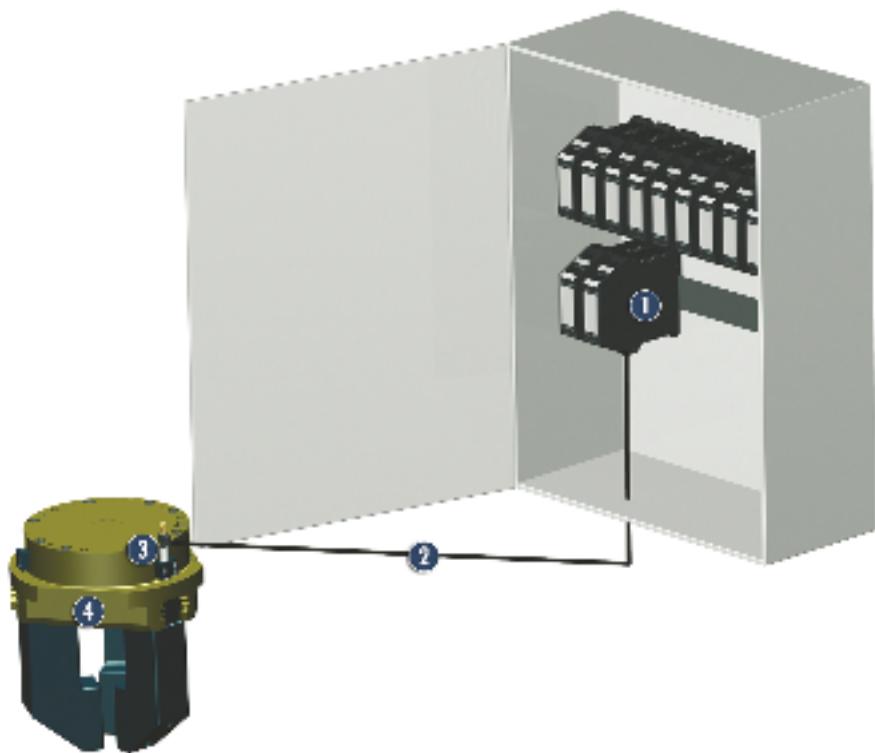
Compact design
for space-saving installation in any control cabinet

Conforms to CE
for absolute safety and long life during permanent operation

Application example

Area of application

for the precise measurement of the gripper jaw position in clean environments



1 APS-M1 Processor

2 APS-K7 Extension Cable

3 APS-M1S Sensor

4 PZN-plus 100
3-Finger Centric Gripper

General information

Warranty

24 months

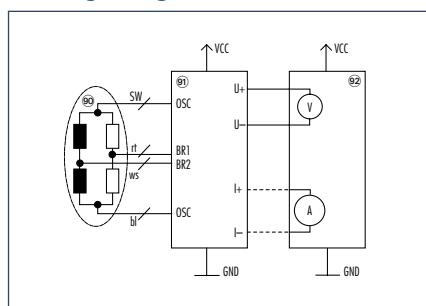
Ordering

The sensor and processor must be ordered as individual items.

Notes

The accuracy of the complete system as stated here is available from a stroke per jaw of 7 mm. The entire range of the sensor cannot be exploited with smaller strokes. The relative accuracy (ratio of repeat accuracy to jaw stroke) decreases, the absolute repeat accuracy (in mm) is the same as for a gripper with a 7 mm stroke, i.e. 0.021 mm.

Wiring diagram



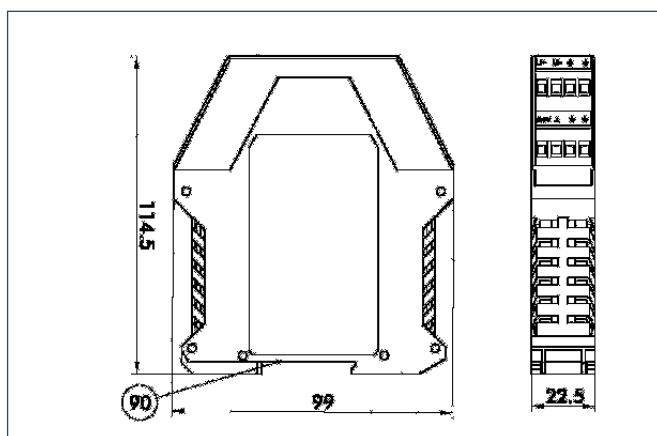
- ⑨0 APS-M1S Sensor
- ⑨1 APS-M1E Electronic Processor
- ⑨2 Automation device, e.g. S7-300

ⓘ When using an APS system, a mounting kit, APS sensor (APS-M1S) and processor (APS-M1E) are required for each gripper. The mounting kits can be found with the grippers. Mounting kits for other components/grippers are available on request. The sensor has a 3 m molded cable.

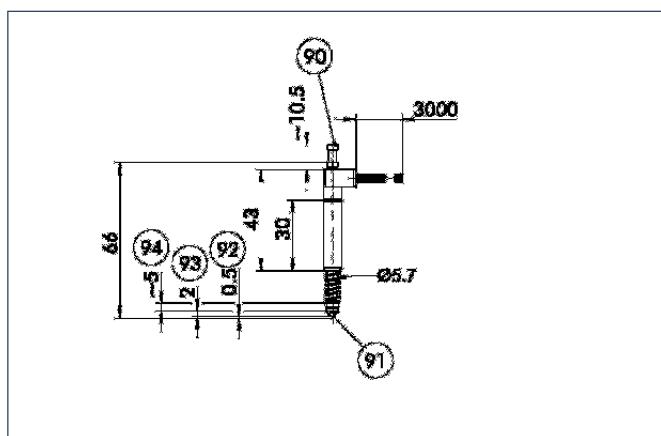
Technical data

Description	APS-M1S
ID	0302062
Measuring stroke	[mm]
2.0	
Measuring accuracy	[mm]
0.004	
Nominal current input	[A]
0.023	
Tightness	67
Thermal drift of zero signal	[%/10K]
0.1	
Thermal drift of amplification factor	[%/10K]
0.2	
Min. ambient temperature	[°C]
10.0	
Max. ambient temperature	[°C]
60.0	
Weight	[kg]
0.16	
Sensor material	Steel
Cable sheath	PUR

Description	APS-M1E
ID	0302064
Supply voltage	DC
Nominal voltage	[V]
24.0	
Min. voltage	[V]
22.0	
Max. voltage	[V]
26.0	
Nominal current	[A]
0.1	
IP rating	20
Min. ambient temperature	[°C]
0.0	
Max. ambient temperature	[°C]
60.0	
Repeat accuracy (sensor and processor)	[mm]
0.3	
Weight	[kg]
0.16	
Housing material	PA
Output signal	0..10 V DC 4..20 mA
Mounting	top hat rail

APS processor

⑨⓪ Groove for mounting rail

APS sensor

⑨⓪ Position with retracted feeler rod

⑨❶ Carbide ball 1/8"

⑨❷ Initial stroke

⑨❸ Range of measurement

⑨❹ Free stroke

APS-K extension cable

As an option, an extension cable can be connected between the sensor and the processor.
(The max. cable length between the sensor and the processor is 10 m, between the processor and its controller (SPC) max. 1 m.)

Description	ID	Length
APS-K2	0302066	2.0 m
APS-K7	0302068	7.0 m

Mounting kits

The suitable mounting kit is specified with the gripper.

ID	Description
0302075	AS-APS-M1-64/1
0302076	AS-APS-M1-64/2
0302077	AS-APS-M1-80/1
0302078	AS-APS-M1-80/2
0302079	AS-APS-M1-100/1
0302080	AS-APS-M1-100/2
0302081	AS-APS-M1-125/1
0302082	AS-APS-M1-125/2
0302083	AS-APS-M1-160/1 and 240/2
0302084	AS-APS-M1-160/2
0302085	AS-APS-M1-200/1 and 380/2
0302086	AS-APS-M1-200/2
0302087	AS-APS-M1-240/1
0302088	AS-APS-M1-300/1
0302089	AS-APS-M1-300/2
0302090	AS-APS-M1-380/1

Force Measuring System

The FMS force measuring system is used for measuring the gripping forces during the gripping process. This opens up numerous new possibilities both during start-up and in the production process.



Function description

The FMS intermediate jaws are screwed on between the gripper base jaw and the top jaw, which comes in contact with the workpiece. Gripping forces on the top jaw result in a flow of force through the FMS intermediate jaw. Intelligently arranged strain gauges inside the intermediate jaw react to the resulting deformation. The FMS processor detects the change in the strain gauges and emits an analog signal indicating the force.

Your advantages and benefits

Simplest handling

via a control line that is directly connected to an SPC

Easy-to-perform measurement

of the actual, active gripping force

Result output via analog voltage value

Simple, linear relationship

between output voltage and gripping force

Simple zero balancing

with button or via control line

Integrated LCD

for visual monitoring

Easy assembly

Dirt-proof and waterproof

also for use in extreme ambient conditions.

Application example



- 1** PGN-plus 100 AS
2-Finger Parallel Gripper
- 2** FMS-ZBA Intermediate Jaw
with Sensor (active)
- 3** FMS-ZBP Intermediate Jaw
without Sensor (passive)

- 4** Workpiece-specific Gripper Finger
- 5** Electronic Processor

Area of application

Gripping force control

By sending control signals to the proportional valve that supplies the gripper, the PLC can influence the automatically measured gripping force.

Teaching robots

When gripping firmly fixed workpieces, the teaching of robots is simple and precise. Symmetrical gripping only takes place if the left- and right-hand gripper jaws apply the same force – thereby protecting the gripper and the robot.

Static grip force monitoring

- Monitoring the grip force as the jaws close prevents the workpiece from being dropped when movement initiates.
- Overload protection by monitoring the max. permitted force, which can be triggered e.g. by an inadvertent increase in pressure, by off-center gripping or the incorrect positioning of the workpiece.
- Preventive maintenance by replacing grippers in good time when there is a decline in the gripping force. This avoids unexpected manufacturing down-times.

Dynamic grip force monitoring

- The effect of acceleration forces on the gripper jaws can be recorded and the motion sequence modified if necessary.
- Component monitoring during highly dynamic movements.

Measuring and teaching processes

- Dimensional checking of the gripped component on the basis of an inserted reference component. If the component to be measured differs by more than ± 0.05 mm from the reference component, teaching can take place. If the difference is smaller, the precise dimensions can be measured accurately even to within ± 0.002 mm.
- Gauging the weight of the component by measuring the force due to weight of the component on the gripper fingers.

General information

For all PGN-plus and PZN-plus grippers

as well as for all grippers with identical finger connection diagram, for other grippers on request (remember to ask about the delivery time!)

Conforms to CE

for absolute safety and long life during permanent operation

Warranty

24 months

Notes

The FMS force measuring system allows you to measure forces that act on the base jaw in the direction of the jaw movement. Up to three active (equipped with sensors) FMS-ZBA intermediate jaws are required for this purpose, depending on the application. The remaining base jaws are equipped with FMS-ZBP passive intermediate jaws (without sensors). Each FMS-ZBA active intermediate jaw requires an FMS-A1 electronic processor for evaluation, and an FMS-AK connection cable for connecting the electronic processor to an PLC or a control cabinet.

FMS Processor



Each FMS-ZBA active intermediate jaw requires an electronic processor.

The FMS-A1 processor is required for intermediate jaw sizes up to 125, the FMS-A2 processor from size 160. The electronic processor is used to prepare, display and forward the measurement results. It is equipped with a housing connector and socket for connecting the force measuring jaw and the connection cable.

Description	FMS-A1	FMS-A2
ID	0301810	0301811
Measuring accuracy [%]	3.0	3.0
Output signal	-5VDC.. +5VDC	-5VDC.. +5VDC
Type of voltage	DC	DC
Nominal voltage [V]	24.0	24.0
Min. voltage [V]	18.0	18.0
Max. voltage [V]	30.0	30.0
Nominal current [A]	0.0045	0.0045
IP rating	67	67
Weight [kg]	63.0	63.0

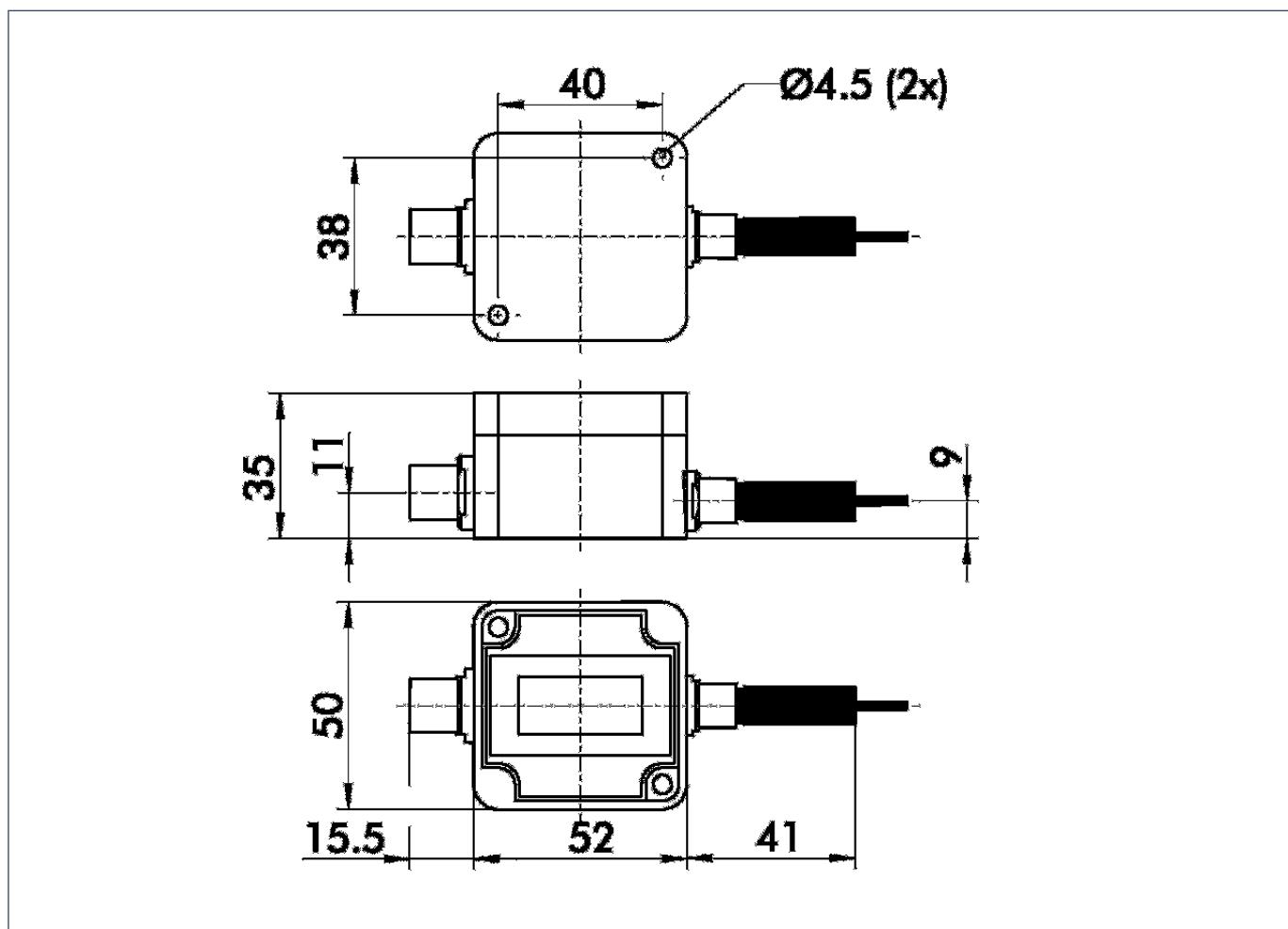
① The output voltage is linear to the forces occurring at the gripper fingers.

The bandwidth of the output signal is not fully exploited by every active intermediate jaw.

Zero balancing must be performed prior to measurement.

The limit class A according to EN 61326 is complied with.

The test to EN 61000-4-2, EN 61000-4-3, EN 61000-4-4 and EN 61000-4-6 was passed in conformity with EN 61326.

Main views**FMS-AK connection cable**

The FMS-AK connection cable is used for connecting the electronic processor to a control cabinet or an PLC. A cable bushing is fitted on the side of the electronic processor, the other side is open.

Description	ID	Length
FMS-AK 5	0301821	5.0 m
FMS-AK 10	0301822	10.0 m
FMS-AK 20	0301823	20.0 m

Force measuring jaws



The force measuring jaw is situated between the gripper base jaw and the top jaw. The gripping force is conducted through it. Active intermediate jaws measure these forces and transfer the measured value to the electronic processor. Active intermediate jaws are equipped with a 30 cm cable and a cable connector. Passive intermediate jaws act solely as a bridge for the forces.

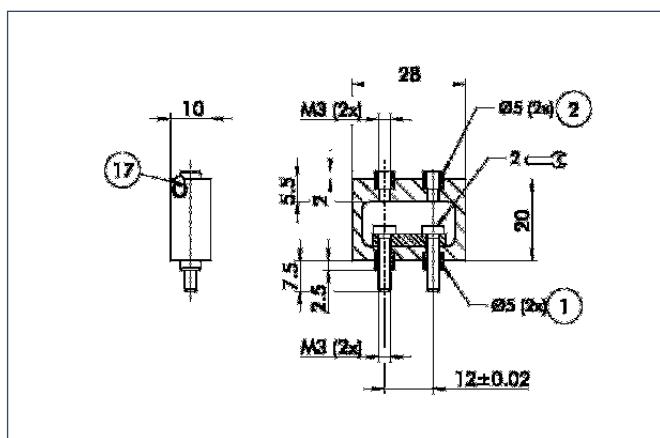
Definitions

① The range of measurement is the range in which the overall system has an accuracy of < 3 %.

The overload range is the range in which the overall system has an accuracy of > 3 %. At the end of the overload range there is a risk of mechanical destruction of the intermediate jaw.

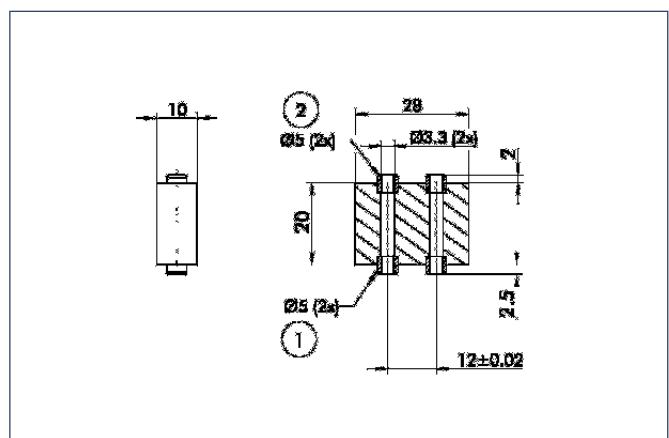
Description	Start of range of measurement ID	End of range of measurement [N]	End of overload range [N]	Weight [kg]	Min. ambient temperature [°C]	Max. ambient temperature [°C]
FMS-ZBA 50	0301830	0.0	145.0	0.03	-10.0	70.0
FMS-ZBP 50	0301831			0.02		
FMS-ZBA 64	0301832	0.0	260.0	0.04	-10.0	70.0
FMS-ZBP 64	0301833			0.025		
FMS-ZBA 80	0301834	0.0	430.0	0.056	-10.0	70.0
FMS-ZBP 80	0301835			0.035		
FMS-ZBA 100	0301836	0.0	685.0	0.082	-10.0	70.0
FMS-ZBP 100	0301837			0.055		
FMS-ZBA 125	0301838	0.0	1120.0	0.128	-10.0	70.0
FMS-ZBP 125	0301839			0.105		
FMS-ZBA 160	0301840	0.0	1600.0	0.24	-10.0	70.0
FMS-ZBP 160	0301841			0.185		
FMS-ZBA 200	0301842	0.0	2325.0	0.403	-10.0	70.0
FMS-ZBP 200	0301843			0.34		
FMS-ZBA 240	0301844	0.0	3700.0	0.69	-10.0	70.0
FMS-ZBP 240	0301845			0.59		
FMS-ZBA 300	0301846	0.0	5150.0	0.907	-10.0	70.0
FMS-ZBP 300	0301847			0.78		
FMS-ZBA 380	0301848	0.0	7100.0	1.84	-10.0	70.0
FMS-ZBP 380	0301849			1.6		

FMS-ZBA 50



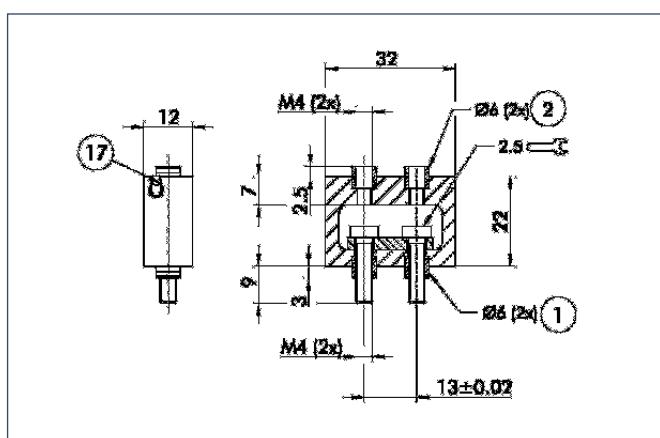
- (1) Gripper connection
- (2) Finger connection
- (17) Cable outlet

FMS-ZBP 50



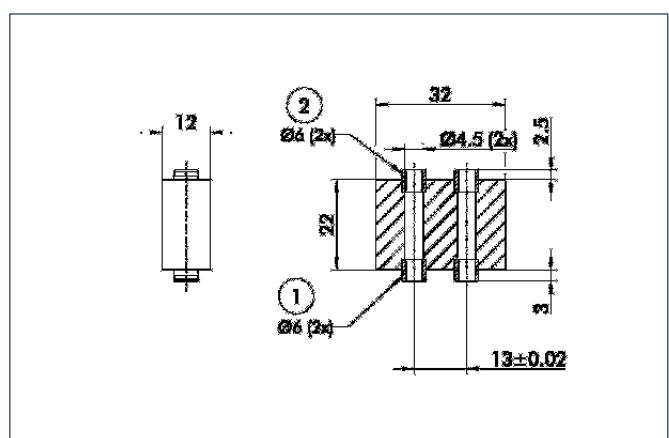
- (1) Gripper connection
- (2) Finger connection

FMS-ZBA 64



- (1) Gripper connection
- (2) Finger connection
- (17) Cable outlet

FMS-ZBP 64

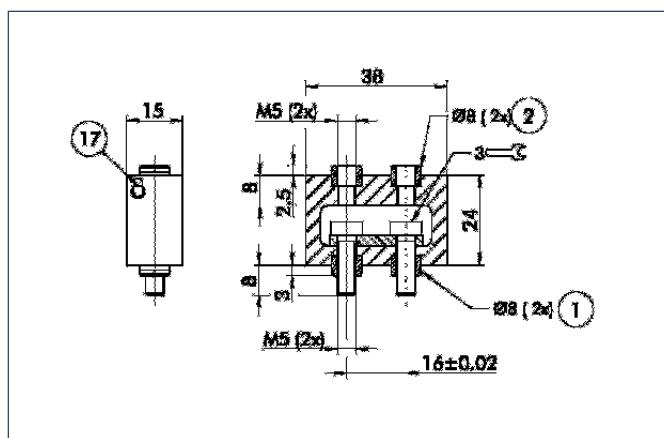


- (1) Gripper connection
- (2) Finger connection

FMS-ZBA/-ZBP

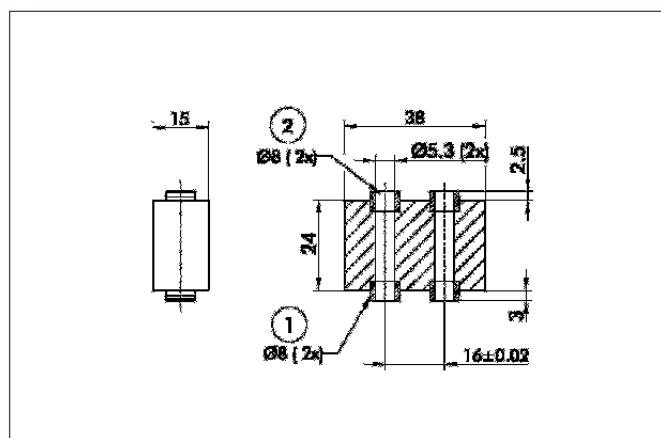
Accessories · Sensor System · Force Measuring Jaws

FMS-ZBA 80



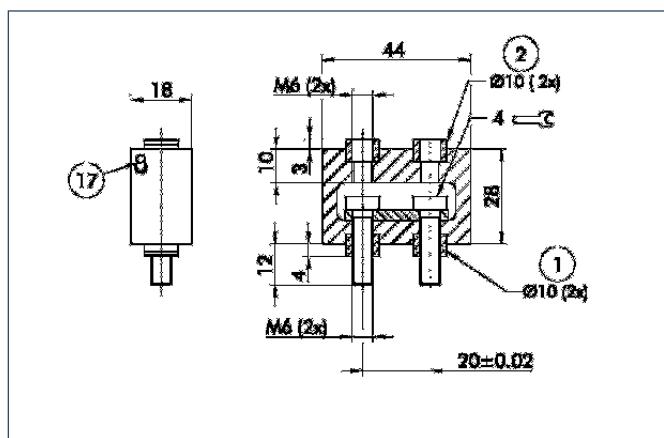
- (1) Gripper connection
- (2) Finger connection
- (17) Cable outlet

FMS-ZBP 80



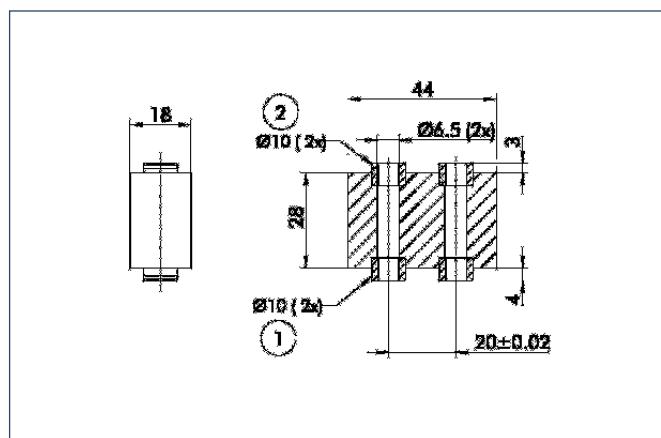
- (1) Gripper connection
- (2) Finger connection

FMS-ZBA 100

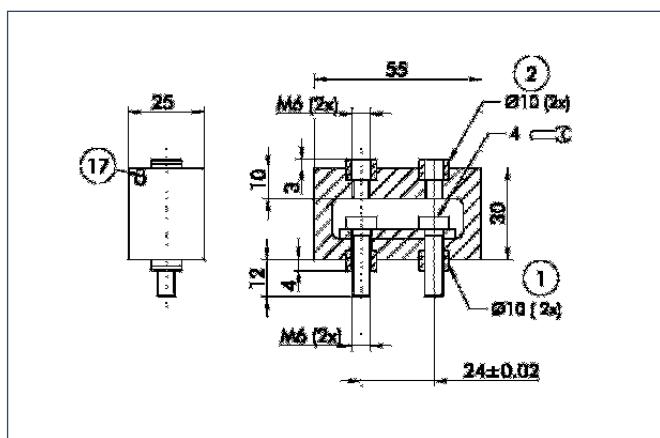


- (1) Gripper connection
- (2) Finger connection
- (17) Cable outlet

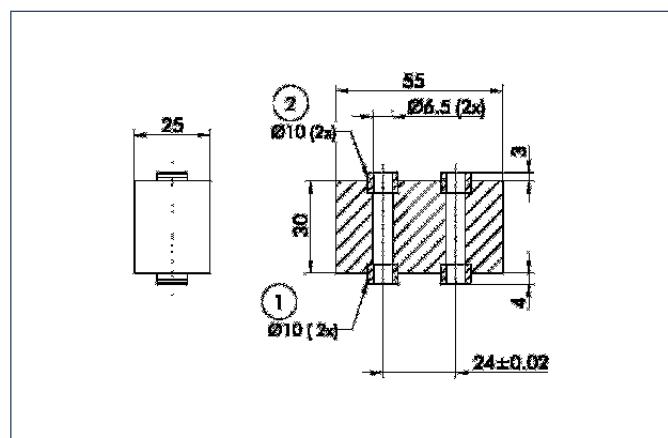
FMS-ZBP 100



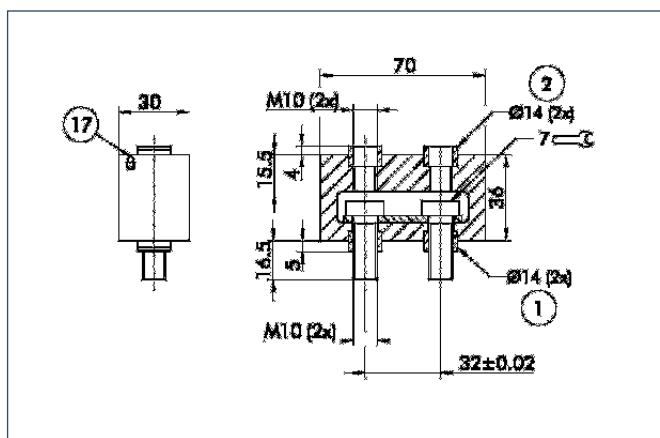
- (1) Gripper connection
- (2) Finger connection

FMS-ZBA 125

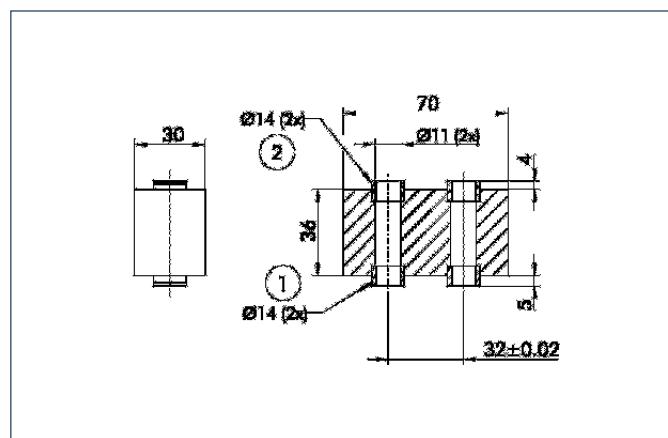
- (1) Gripper connection
- (2) Finger connection
- (17) Cable outlet

FMS-ZBP 125

- (1) Gripper connection
- (2) Finger connection

FMS-ZBA 160

- (1) Gripper connection
- (2) Finger connection
- (17) Cable outlet

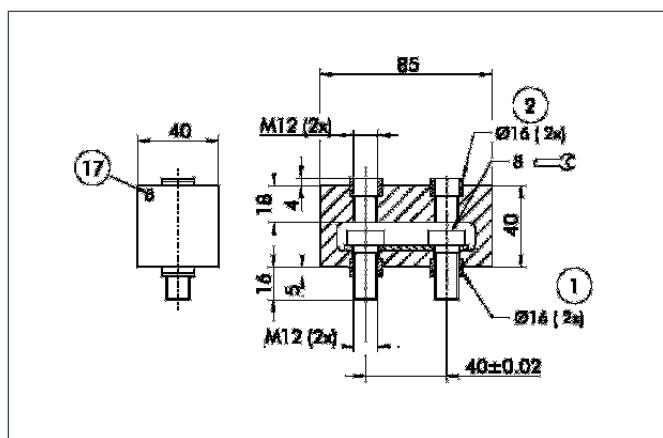
FMS-ZBP 160

- (1) Gripper connection
- (2) Finger connection

FMS-ZBA/-ZBP

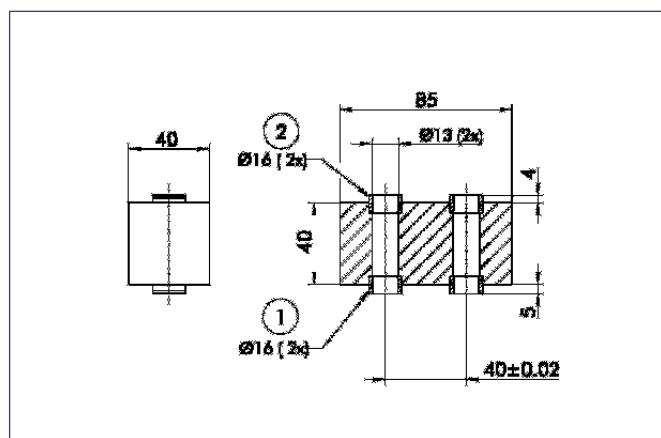
Accessories · Sensor System · Force Measuring Jaws

FMS-ZBA 200



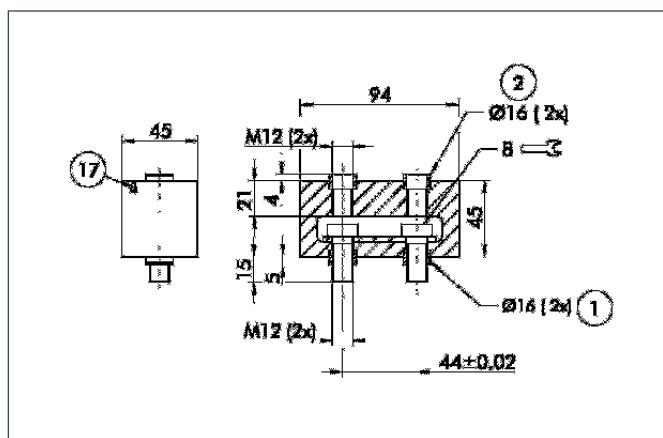
- ① Gripper connection
- ② Finger connection
- ⑯ Cable outlet

FMS-ZBP 200



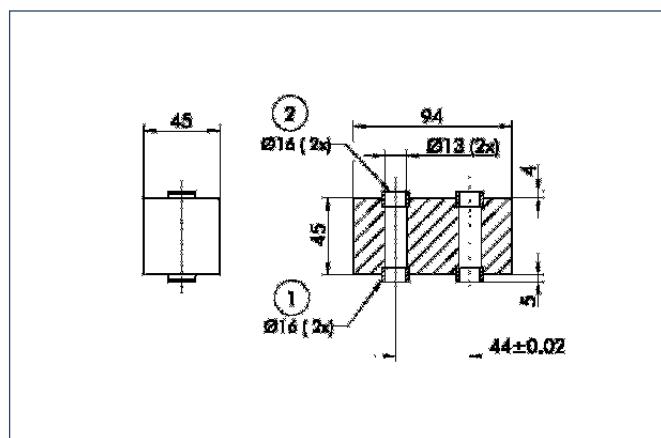
- ① Gripper connection
- ② Finger connection
- ⑯ Cable outlet

FMS-ZBA 240

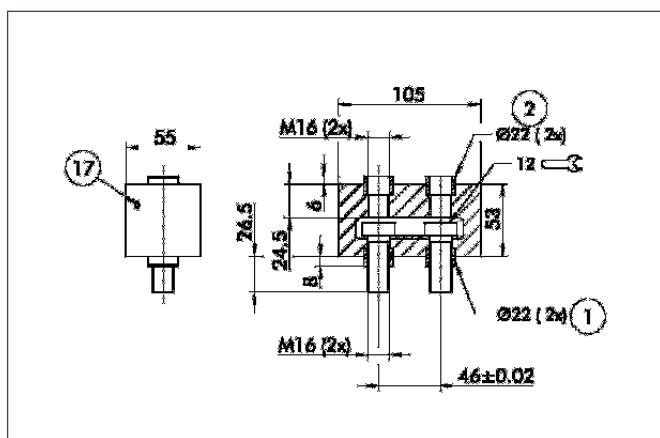


- ① Gripper connection
- ② Finger connection
- ⑯ Cable outlet

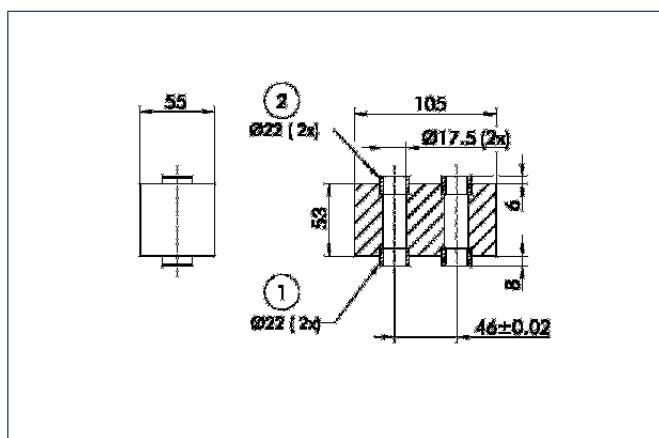
FMS-ZBP 240



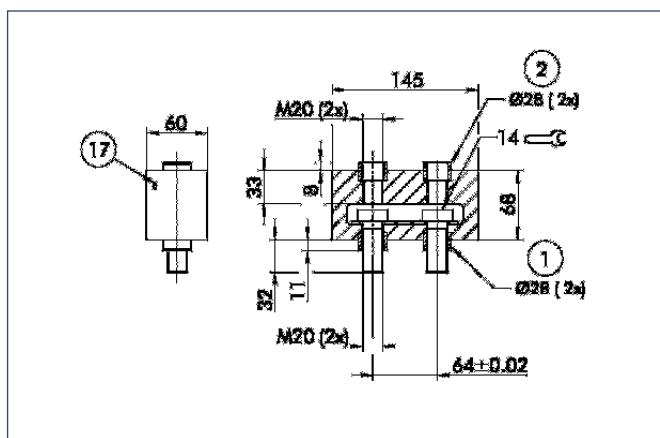
- ① Gripper connection
- ② Finger connection

FMS-ZBA 300

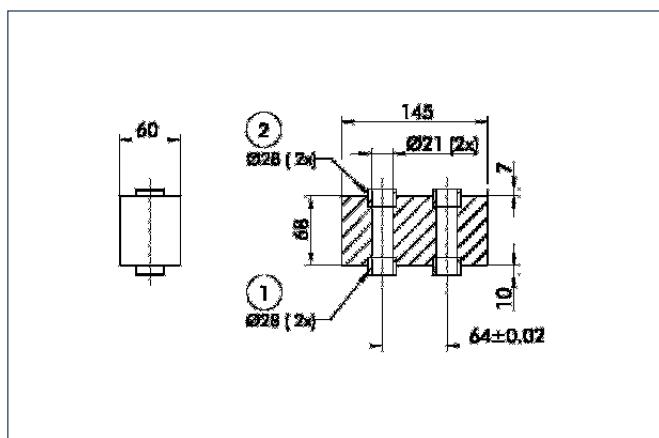
- (1) Gripper connection
- (2) Finger connection
- (17) Cable outlet

FMS-ZBP 300

- (1) Gripper connection
- (2) Finger connection

FMS-ZBA 380

- (1) Gripper connection
- (2) Finger connection
- (17) Cable outlet

FMS-ZBP 380

- (1) Gripper connection
- (2) Finger connection

Centering Sleeves

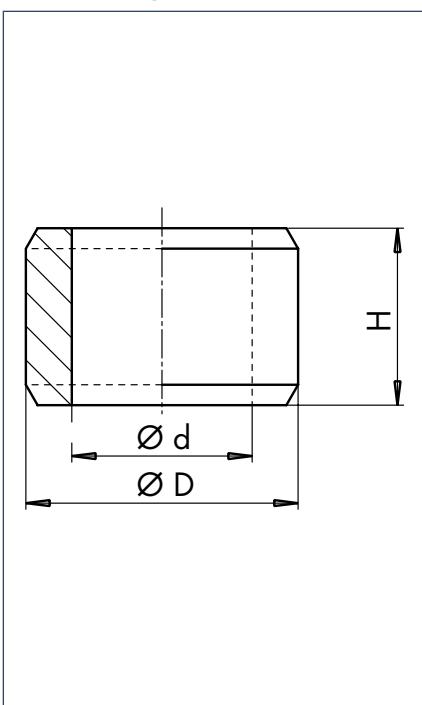
Accessories · Mounting Elements



Product advantages

- Simple, space-saving centering
- Easy mounting
- High replacement accuracy
- Suitable for many SCHUNK automation components

Centering sleeve dia. ZHU

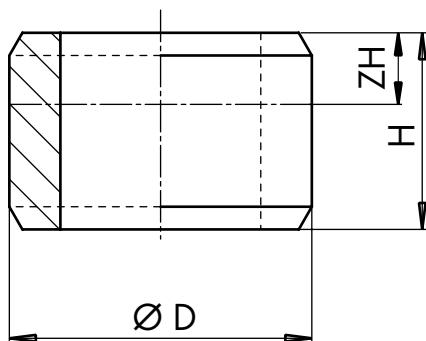


ⓘ SCHUNK recommends an H7 fitting for the hole for the insertion of the sleeve.

Technical data

Diameter [mm]	ID	$\varnothing d$	H
2	9941547	1.3	1.95 - 0.05
2.5	9941628	1.7	1.95 - 0.05
3	9941629	2.1	1.95 - 0.05
3.5	9939947	2.1	2.95 - 0.05
4	9939376	2.6	3.95 - 0.05
5	9939377	3.1	4.35 - 0.05
6	9939384	4.1	5.35 - 0.05
8	9939378	5.1	5.35 - 0.05
10	9939379	6.2	6.65 - 0.05
12	9939380	8.2	6.65 - 0.05
14	9939381	10.2	8.60 - 0.10
16	9939382	12.2	8.60 - 0.10
22	9939383	16.2	13.60 - 0.10
28	9941220	21.0	17.60 - 0.10

Centering sleeve dia. ZS



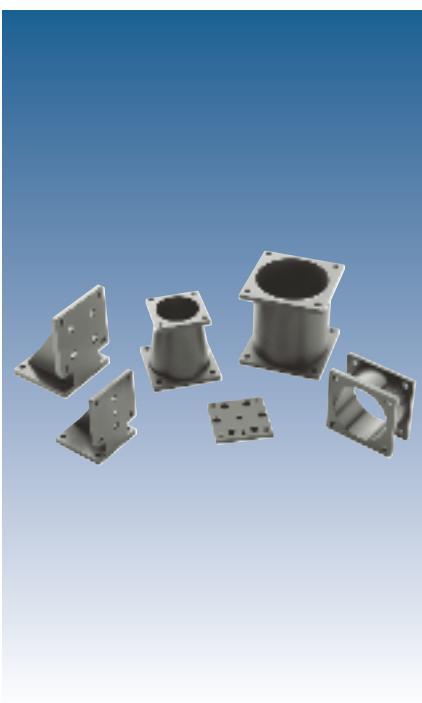
ZS centering sleeves suitable for SLF linear axes

Description	ID	Ø D [mm]	H [mm]	ZH [mm]
ZS-00-12	0330728	12	6	2.8
ZS-01-15	0330729	15	6	2.8
ZS-02-18	0330730	18	6	2.8
ZS-03-22	0330656	22	6	2.8

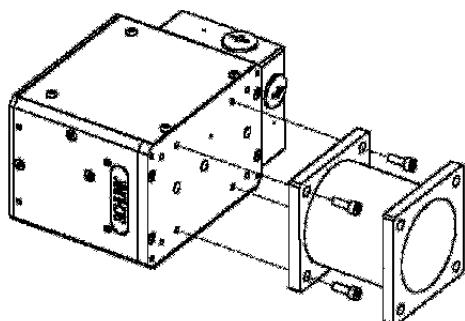
① ZH dimension \triangleq Projection of centering sleeve on installation in the SLF linear axis

Product advantages

- Standard elements for connecting PowerCube modules with complete repeat accuracy
- Suitable for all grippers and rotary units of the PowerCube series (PG/PR/PW/PSM/PDU)
- Shaped designs: straight, conical and right-angle
- Special lengths on request



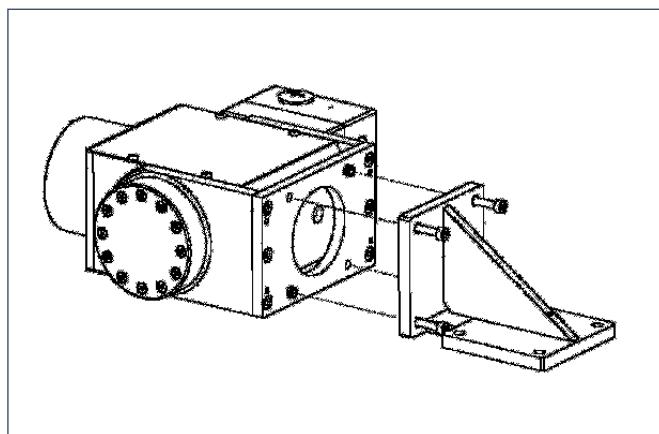
Straight PAM



Straight standard connecting element suitable for PG grippers, PR rotary unit, PW rotary tilting unit, PSM/PDU servo-motors and PLS linear modules of the PowerCube series. Special lengths on request

Description	PAM 100	PAM 101	PAM 102	PAM 103	PAM 104	PAM 105
ID	0307800	0307801	0307802	0307803	0307804	0307805
Dimensions [mm]	70x70/35/70x70	70x70/70/70x70	90x90/45/90x90	90x90/90/90x90	110x110/55/110x110	110x110/110/110x110
Suitable for	PG 70/PR 70/ PW 70/PSM 70/ PDU 70/PLS 70	PG 70/PR 70/ PW 70/PSM 70/ PDU 70/PLS 70	PR 90/PW 90/ PSM 90/PDU 90/ PLS 90	PR 90/PW 90/ PSM 90/PDU 90/ PLS 90	PR 110/PW 110/ PSM 110/PDU 110/ PLS 110	PR 110/PW 110/ PSM 110/PDU 110/ PLS 110

Right-angle PAM

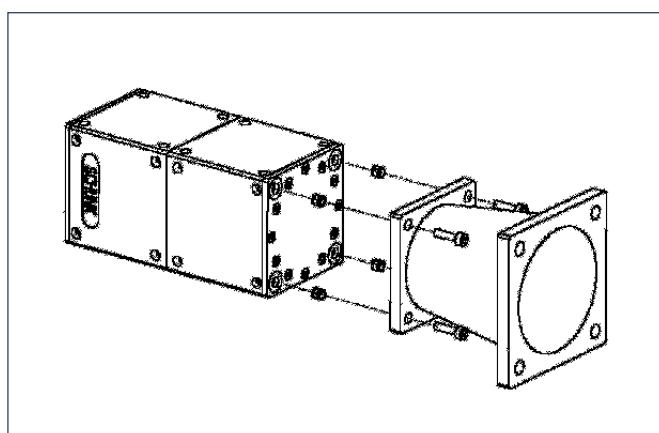


Right-angle standard connecting element suitable for PG grippers, PR rotary unit, PW rotary tilting unit, PSM/PDU servo-motors and PLS linear modules of the PowerCube series. Special lengths on request

Description	PAM 120	PAM 121	PAM 122
ID	0307820	0307821	0307822
Dimensions [mm]	90° / 70.5x98	90° / 90.5x122	90° / 110.5x146
Suitable for	PG 70/PR 70/PW 70/ PSM 70/PDU 70/PLS 70	PR 90/PW 90/PSM 90/ PDU 90/PLS 90	PR 110/PW 110/PSM 110/ PDU 110/PLS 110



Conical PAM



Conical standard connecting element for connecting PowerCube modules in various sizes, suitable for PG grippers, PR rotary unit, PW rotary tilting unit, PSM/PDU servo-motors and PLS linear modules. Special lengths on request

Description	PAM 110	PAM 111	PAM 112	PAM 113
ID	0307810	0307811	0307812	0307813
Dimensions [mm]	90x90/45/70x70	90x90/90/70x70	110x110/55/90x90	110x110/110/90x90
Suitable for	PR/PW/PSM/PDU/ sizes 70 and 90	PR/PW/PSM/PDU/ sizes 70 and 90	PR/PW/PSM/PDU/ sizes 90 and 110	PR/PW/PSM/PDU/ sizes 90 and 110

Valves and Fittings

Accessories · Pneumatic Elements

Application example



1 SDV-P pressure maintenance valve

2 SWV pivot screw connection

3 PGN-plus 2-Finger Parallel Gripper
with workpiece-specific gripper
fingers

Pressure maintenance valve and fitting



Your advantages and benefits

Suitable for all SCHUNK gripper, rotary and linear modules and robot accessories

Everything from a single source

The SDV-P pressure maintenance valve protects against a loss of pressure

Version as plug-in connection (SCHUNK fittings)



Pressure maintenance valve



In the event of a loss of pressure, the pressure maintenance valve prevents the air from escaping out of the gripper. This prevents a loss in clamping force, and the workpieces remain securely clamped in the gripper jaws. Especially suitable for grippers that cannot be equipped with mechanical pressure maintenance.

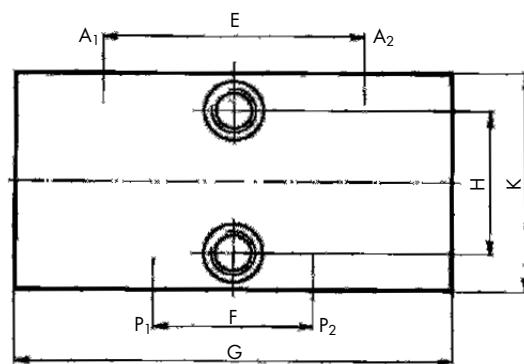
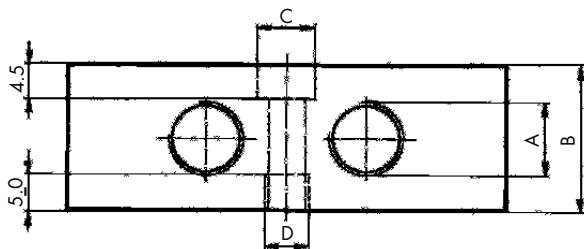
Function

Two check valves connected in parallel, which automatically open the return channel and close the pressure line on a loss of pressure.

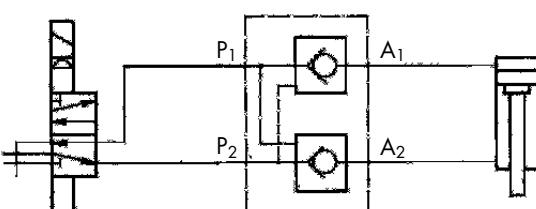
Technical data

Description	SDV-P 04	SDV-P 07
ID	0403130	0403131
Nominal size	[mm]	4
Flow	[l/min]	200
Weight	[g]	100
Medium	filtered compressed air 10 µm lubricated or dry	filtered compressed air, 10 µm lubricated or dry
Pressure range	[bar]	0.5 - 10
Temperature range	[°C]	-10 to +80
Switching time	[ms]	approx. 10
Version		stainless steel
Max. drop in pressure within 24 h. (test volume 2 cm ³)	[bar]	0.5
		0.5

① Max. flow per port at p = 6 bar

Main views

Variable	SDV-P 04	SDV-P 07
A	$G\frac{1}{8}''$	$G\frac{1}{4}''$
B	20	24
C	8	8
D	M 5	M 5
E	36	44.6
F	22	26
G	60	75
H	20	26
K	30	40

Circuit diagram

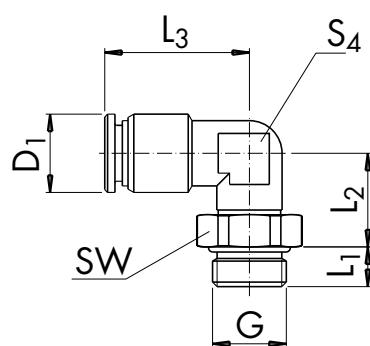
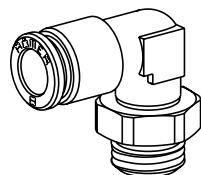
WV elbow fitting

Version as push-in connection for simple, rapid connection
to pneumatic energy supplies

Technical data

Description	WV-G 1-8-6	WV-G 1-8-8	WV-G 1-4-6
ID	9937129	9936730	9937170
Hose [mm]	6	8	6
Material of body	Ms 58 nickel-plated release ring: POM plastic, gray		
Material of clamping collet	stainless steel seal: O-ring, NBR		
Temperature range [°C]	-10 to 60	-10 to 60	-10 to 60
Max. operating pressure [bar]	20	20	20

Main views of WV elbow fitting



Variable	WV-G 1-8-6	WV-G 1-8-8	WV-G 1-4-6
G	1/8"	1/8"	1/4"
L1	5	5	7
L2	13.5	16	15.5
L3	22	25.5	23.5
D1	12	14	12
SW	13	13	17
S4	10	12	10

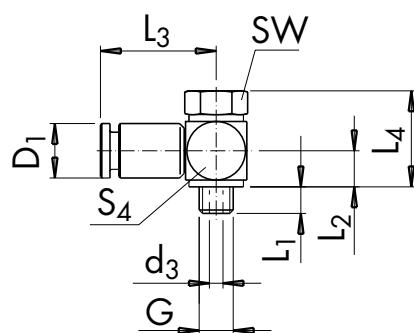
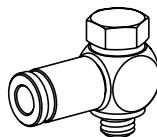
SWV banjo fitting

Version as push-in connection for simple, rapid connection
to pneumatic energy supplies

Technical data

Description	SWV-M3-4	SWV-M5-6	SWV-G8-6	SWV-G4-6	SWV-G4-8
ID	9210505	9936171	9937152	9937128	9936728
Hose [mm]	4	6	6	6	8
Material of body			Ms 58 nickel-plated release ring: POM plastic, gray		
Material of clamping collet			stainless steel seal: O-ring, NBR		
Temperature range [°C]	-10 to 60	-10 to 60	-10 to 60	-10 to 60	-10 to 60
Max. operating pressure [bar]	20	20	20	20	20

Main views of SWV banjo fitting



Variable	SWV-M3-4	SWV-M5-6	SWV-G8-6	SWV-G4-6	SWV-G4-8
G	M3	M5	G1/8"	G1/4"	G1/4"
d3	1.1	2	5	7	7
L1	2	4	6.5	8	8
L2	2.5	6.2	8.25	8.4	15.3
L3	7.3	18.5	22.5	24.5	25
L4	7.3	15.8	20.5	21.6	21.6
D1	3.4	10	12	12	13.5
SW	5	8	14	17	17
S4	5	10	15	19	19

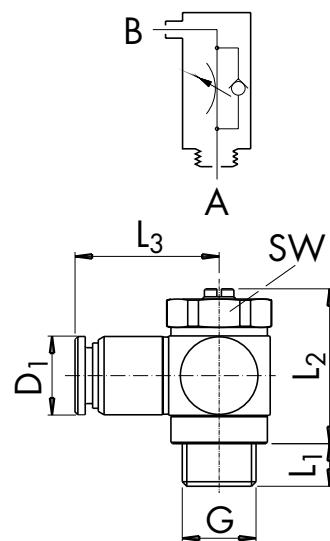
DSV banjo fitting with one-way flow control valve

Version as push-in connection for simple, rapid connection
to pneumatic energy supplies

Technical data

Description	DSV-M3-4	DSV-M5-6	DSV-G8-6	DSV-G4-6	DSV-G8-8
ID	9720005	9936160	9936159	9936161	9936162
Hose [mm]	3	6	6	6	8
Material of body			Ms 58 nickel-plated release ring: POM plastic, gray		
Material of clamping collet			stainless steel seal: O-ring, NBR		
Temperature range [°C]	-10 to 60	-10 to 60	-10 to 60	-10 to 60	-10 to 60
Max. operating pressure [bar]	20	20	20	20	20

Main views of DSV banjo fitting with one-way flow control valve



Variable	DSV-M3-4	DSV-M5-6	DSV-G8-6	DSV-G4-6	DSV-G8-8
G	M3	M5	G1/8"	G1/4"	G1/8"
L1	2.5	4	5	6.5	5
L2 max.	29	21.5	30	32	30
L3	11	21	22.5	24.5	23
D1	4.8	10.4	12	12	14
SW	knurled	8	14	17	14